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SOFT STEEL.

We return again to the subject of steel with reference to the effects of certain methods of casting on quality. The experience at the Edgar Thompson steel works has shown the deficiencies of the ordinary methods of casting low or soft steel. When the steel is poured to within eight inches of the top of the mold and then the top closed, the gases will cause the steel to swell and fill the mold entirely, but when the very same steel is poured to the same height and then subjected to a steam pressure of 150 pounds to the square inch, the gases are so completely expelled as to emit a loud roar, and when the ingot is stripped it is found to be two and a half inches lower than when poured. The English steel manufactories all follow this method. The owners of the steel works at Terre Noire in France invariably make steel without blow holes by using a silicide of manganese and iron which gives to the product remarkable qualities. The absence of blow holes is accounted for by the circumstance of the silicon decomposing the oxide of carbon, which is in dissolution, and which tends to escape during solidification. The manganese reduces the oxide of iron, and prevents a further production of gases by the reaction of the oxide on the carbon. A capital point is that the metal is not altered by a foreign body. In the form of a molded piece or ingot, it possesses the same properties as a rolled and hammered metal. This proves that such mechanical operations as forging and rolling, are not necessary to the production of the best results as to quality, and that steel which has been cast without blows in a suitable manner and repeatedly tempered in the right way attains a perfectly satisfactory molecular state which makes it applicable for all purposes. The special qualities giving value to such steel are its extreme ductility when cold, its ability to stand punching without appreciable loss of strength between the rivet holes, its not requiring to be annealed after shearing or punching, its having a smoother surface than iron, its capability of being forged and worked hot and its uniformity of quality being absolutely insured and its strength along the grain. Another result is arrived at, namely that the annnealing of plates and angles after punching is unnecessary. In addition to freedom from the weakening influence of blow holes, the securing the desired quality independently of forging and rolling, and the securing unabated strength notwithstanding punching, the steel with all its ductility having the strength of iron, are accomplishments which must insure a rapid and enormous extension of the use of soft steel in preference to iron for plates, wire, angles, rivets, sheet and general purposes. To this end the economy of fuel and labor in the manufacture of steel as compared with iron is of the first consideration. "Combination prices" cannot last forever.

WHAT IS MALLEABLE IRON?

Malleable cast iron has of late years been brought into extensive use for articles in which the cost of labor if made of wrought iron would be too great, or when a casting is needed without the brittleness of common cast iron. Any pig iron which makes good bar iron will make malleable iron, but the pig iron to be preferred is a white charcoal pig melted in cupolas or in a reverbatory furnace. White iron, owing to the state in which carbon exists in it, besides giving a better appearance to the article, the combined carbon not being visible, causes the article to appear with the same sharpness of outline and smoothness of surface after as before the annealing. The thinner the casting the more rapid will be its transformation into malleable metal. For some reason, not well understood, it would appear that a temperature too high or prolonged will harden surfaces already softened. Castings not too thick and of a good metal, thoroughly decarburized, may be considered chemically as iron without fibre—so much so that they may be bent double while cold, without breaking and without previous condensation under the hammer. The cast articles are tempered in an iron cylinder and imbedded in fine fresh river sand, or finely pounded iron ore, or black manganese, or a mixture of the whole of these materials. An exposure of the hardest cast iron, if pure, from twenty-four to thirty-six hours to the fire, will render it malleable to a certain degree. When tempered, the articles are put into a revolving barrel together with some sand to be cleaned and polished to a certain extent, by rubbing one against another. The cost of the castings is from seventy to eighty per cent. more than from ordinary iron. Scissors, sewing-machine parts, the butt ends and guards and other parts of gun locks, and ornaments such as those for carriage and harness furniture—it being particularly qualified for being tinned and plated, are made in large quantities from malleable iron castings. Technically, the term malleable iron designates those castings, the brittleness of which has been partly or entirely removed by the operation of annealing, which consists in burning off the whole or a part of the carbon combined with the metal from which the castings are made. On account of the atomic state of division in which combined carbon exists, it is easily removed from the metal either by the action of oxidyzing agents such as metallic oxides and the oxidyzing flame of a puddling furnace, or by readily combining with hydrogen and forming hydro carbides.

THE MECHANICS OF FORM.

The determination of form in the working parts of machines—regarding form separately from general constructive design, constitutes a science in itself, involving a whole body of mechanical principles. Mere form is inert, but in action it tells alike on the working results, and so possesses potential power. Many valuable improvements brought out, merely consist in changes of form in the operative portions of existing machines or tools, changes with underlying principles. The slower progress which characterized early inventions, the lesser activity of the suggestive faculty, was from too strong an adherence to set forms. The mechanical spirit of this country breaks away from the bondage of mere conventionalism, even as to form, and both as to machines and tools, form is studied for its effect on action. Take for instance the lathe. This machine has to afford absolutely stright lines of movement for the guidance of the cutting instrument, whereby the true circle derived from the spindle and dead center point is developed into a true cylinder, but not so unless the parent circle and straight lines are correct in themselves. Dr. Anderson observes: "The lathe is chiefly intended to impart to materials true circles, straight lines, and flat surfaces, and all of those conditions must first of all exist in the tool. The bearing surface of the spindle neck must in itself be absolutely round in the strictest sense. The mathematically true circle here referred to is practically very difficult to attain. Many tools are supposed to be round, but which are not so in reality." It is seldom in guages there are true circles each fitting accurately into the other yet perfectly free in every position. Again, as to the planer, intended chiefly for the production of flat surfaces, or by a combination of its straight lines with the circles of some appendage on the table, for cylindical surfaces or cones, if a perfectly flat surface is required from the lathe, the cutting instrument must pass in a straight line transversely to the axis of the revolving spindle, and if the two are set absolutely at right angles to each other, a correctly flat surface is the result; but if any of the conditions of accuracy are wanting, then imperfection in the product is inevitable. So in making a perfect screw, it is evident that should there be any imperfection in the screw die, or in the divisions in the teeth of the wheels by which it receives collateral motion, the screw will reproduce these. The planer must be correct in all its lines or transfering surface if hand tools have not to be resorted to. Nothing good comes out of a bad automatic tool, whatever the skill of the mechanic. As want of truth and accuracy entails greater cost of production, the present day has witnessed the rise of specialists, manufacturers who excelling in some one department devote themselves entirely to it, the field of supply being sufficiently large to afford handsome returns in any one line to superior excellence. Such men appreciate above all others the importance attaching to the mechanics of form.

CLEVELAND IRON TRADE.

A somewhat better feeling characterizes the ore trade, though the aggregate amount of business done is not satisfactory to dealers. At no time at this season has there been so large a stock of ore on dock, an amount somewhat exceeding 700,000 tons. Sales are somewhat impeded by the strike in coal mines in Central and Eastern Ohio, preventing pig iron furnaces from starting up. Transactions in pig iron are moderate and full prices are maintained, dealers being confident of the approach of an active market. For certain brands higher figures are asked for prompt delivery. The demand for charcoal irons, both foundry and car wheel grades, has improved. Judging by the extent to which the resumption of work is going on at the independent mills at Ironton, Portsmouth, Pomeroy, Wheeling and Pittsburgh, which are running double turn and putting out a large product, buyers will very likely soon realize the advantage of prospective purchases. At the same time the course of the market largely depends on the issue of the Western strike. Structural iron is in good request at full rates. Plate and tank iron is improving for forward deliveries; the capacity of mills producing it is overtaxed. There is an active demand for wrought iron pipe, and mills cannot take all orders offering. A further advance in nails is imminent.

THERE have been large deliveries of lumber at this port the present week, and heavy sales to country dealers, farmers now finding time to attend to repairs. Supplies for buildings have also absorbed large quantities. The Cleveland requirements for soft and hard woods for furniture purposes is exceeded by the demands on us from cities in this and neighboring States, but we trust that no long period will elapse before we possess furniture manufactories on an imposing scale. What is necessary to wrest the remaining Eastern supply trade in this line is the production of superior

classes of furniture in which skillful design and the application of veneering in hard woods find ample remuneration.

IT will be seen that this journal is enlarged to the extent of eight pages, and yet the pressure on our space has been such as to compel us to withhold numerous articles and a large body of serviceable mechanical information, which, will, however, duly appear in our next issue. Our market reports and price list are necessarily omitted.

MANUFACTURES.

TO MACHINISTS, MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own language, as all such contributions will be properly revised before sending to press.

OHIO INDUSTRIES.

CLEVELAND.

THE Otis Tube Works Co., manufacturers of lapweld pipe and boiler flues, whose works are corner Hamilton street and C. & P. railroad crossing, have been lying idle for about three months on account of the iron and steel strike. They will open their works as soon as they can get iron. The late Mr. W. L. Otis was President of the company at its outset. B. F. Rouse, Secretary; Mr. John Fisher, Superintendent, and Mr. M. M. Murphy, general agent.

THE Ohio Steel Barb Fence Co., foot of Case avenue, are running full force 14 hours per day, with plenty of orders awaiting execution. Mr. George W. Billings, Jr., is President; Mr. Charles A. Billings, Vice President and Secretary, and Mr. Frank Billings General Superintendent.

MR. CHARLES W. STEARNS, stone dealer, 150 Merwin street, is running about 15 teams and handling about 15 to 20 car loads per day.

THE King Iron Bridge & Manufacturing Co., situated corner St. Clair and Wasson streets, report a good business outlook. They are just finishing six spans for N. Y. L. & W. R.R. Co., on their new line running into Buffalo. A large number of highway bridges are also in process of construction at their works. About 300 men are in the company's employment. About 200 bridges have been built during the past year by this company. They do railroad work exclusively. Besides all the railroad bridge work, the company has built the iron buildings of the new Central Works, consisting of casting house, stock house and tower. Also the new N. Y. P. & O. central passenger depot of our city. One of their specialties is railroad frogs, crossings, and switches; also wrought iron turn tables.

MESSRS. Maher & Brayton, proprietors Cleveland Wheel and Foundry Works, No. 20 Carter street, corner Collins, state that they have a rushing business in the car wheel line, and that they are full of orders in other departments. The company, which has increased its capacity greatly the past year, casts about 70 tons per day. Shipments of car wheels are made as far as San Francisco.

THE H. P. Nail Co., have been running double time for more than a year. Among the advantages claimed for their steel wire brads and finishing nails, are that these will not break in driving or split the wood, but will make the work stronger. The use of a brad-awl is unnecessary. The nails are cheaper, there being many more to the pound, and they are the only finishing nail—small heads, sharp points, no taper. They have advance orders all the time from large furniture, organ, picture frame makers and car builders, house and office furnishers.

MESSRS. Reeve & Son, Novelty Iron Works, have completed their contract for the great bridge at Toledo, of a length of about 2,000 feet. It consists of one wrought iron draw, span 340 feet, the longest in this State, and nine spans of 180 feet each.

THE American Tool Company, Cleveland, are introducing a new heading plane which planes all thicknesses of heads, and all kinds of timber so rapidly that it requires two men sharply at work to feed and take care of the stock.

AT Farnham's Brass Works, 23 to 27 Center street, established in 1834 for brass castings and brass goods, 40 men are employed. The full capacity of the establishment is taken up. For five years business has been steady.

AT the Cleveland Steam Boiler Works, 12 to 16 West street, are being built four large 30 feet boilers for the State House at Columbus, O. Mr. C. has a full supply of orders.

PALMERS & DEMOOY, iron foundry, 96 Merwin street, who make light-gray castings a specialty, are just commencing to build a large addition to their works. They are running with a full corps of workmen.

THE Phoenix Iron Works, successors to the Union Machine Works, Wasson street, Thompson, Corris & Co., present a scene of busy activity. New machinery of the latest and most approved make, capable of accommodating the largest kind of work, has been added and is now running with a full complement of skilled workmen in attendance. The company is just completing a large air compressor for the Boston and Albany copper mines in Houghton county, Mich., which will be shipped in few days. The business outlook is reported as very favorable.

MR. PHILIP DECUMBE, hat manufacturer, 198 Superior street, is running fourteen hours a day in supplying the new styles of silk hats to the trade.

THE Barney & Smith Manufacturing Co., Dayton, are engaged in the manufacture of passenger and freight cars, from three to four months' orders from old contracts having yet to be filled. They are employing 1200 men.

THE Vulcan Iron Works, Toledo, melt up five tons of pig iron a day, and are busily engaged in constructing railroad excavators, and have recently added about $10,000 worth of new and improved machinery.

ABOUT 1000 persons are employed by the Columbus Buggy Co., Columbus.

THE Solid Steel Company, of Alliance, has been incorporated with a capital stock of $100,000.

THE Monitor Threshing Machine Co., of Salinesville, has been organized with a capital of $20,000.

AT Walker, Columbiana county, are located extensive sewer pipe, terra cotta and fire-brick works, under the proprietorship of F. U. Walker. Unlimited supplies of a superior quality of clay is here found.

AMONG the members of the company organized in Youngstown for the manufacture of Siemens patent steel, and for which a site has been acquired. Wm. Tod & Co., John Stambaugh, Jos. H. Brown, Robt. McCurdy and C. D. Arms are large stockholders. A large Siemens regenerative furnace will be built, and the machinery will include all the latest improvements.

AN addition has been made by Messrs. Woodruff & Sons, Salem, to their stove factory, which is one of the largest in the country.

THE Hot Polished Shafting Co., Youngstown, has elected L. E. Cochran President, and M. S. Tracy Secretary and Treasurer. The company have contracted for the necessary buildings, and will commence the manufacture in a short time.

THE Ætna Glass Works, Bellaire, is in full blast again. They have added to their line of table ware their No. 121 pattern, something new, cheap and neat. This company have the largest line of blown bar ware in the west, which they are now offering both in lime and flint glass. They also make a specialty of engraving and etching, having a great number of patterns and the necessary men and machinery.

THE Union Manufacturing Co., Toledo, have for their specialties the "Union" improved churn and the "Globe" wash board, as well as boy's express wagons, for all which orders are being received on an increasing scale.

THE new glass works, East Liverpool, of which George W. Fry is President, and Frederick H. Hendrick Secretary and Treasurer, will manufacture fine pressed, blown, cut, and engraved table glassware. The works have started with 150 employes. The furnace is one of fourteen pots, and is fired with a patent teaser from below and is strongly constructed. In the lear room are six tempering pans, which are the largest in the United States. The lears are supplied with sulphur flues, and shut off from the furnace or manufacturing room by a solid fire brick wall, The lear room is 60x68 feet. The cutting shop, is 32x48 feet; and the engraving room adjoining, 16x80 feet, where twenty engravers will be employed. The mold shop is 32x48 feet; the packing room 64x80, with a shipping platform, covered, of 12x226 feet, on a level with the cars on the side track, from which material can be taeen in chutes, or packages conveyed on skids to almost any part of the works. The pot room is 64x64; the mixing room 32x48; the grinding room for pot clay, 16x16; and the engine is sixty-five horse power. The basement room, 48x96, has bins for storing soda and other materials. The sand used is brought from beyond Altoona.

THE Dresden Pottery, owned aud operated by Brunt, Bloon, Martin & Co., East Liverpool, has been purchased by the following persons: H. A. McNicol, $20,000; Mr. Emery, a member of the former firm, $10,000; and $10,000 by employees and others. The works in the future will be operated on the co-operative system, and will represent a limited capital of $50.000. Of this, $44,000 has been paid up. The price paid for the works was $40,000.

C. C. THOMPSON & Co., East Liverpool, manufacturers of Rockingham and yellow ware, have as many orders as they can attend to with promptness and not be crowded. They predict a good fall trade.

CARTWRIGHT BROS., East Liverpool, manufacturers of Rockingham and yellow ware, have been running steadily all aloug, and they are doing a prosperous trade. They make an extensive and select assortment of goods.

THE Diamond Match Co., Akron, will soon build an extensive brick warehouse at their works in the southern part of the city.

DEFIANCE cooperage works have resumed.

THE "Beacon" states that 5,000,000 brick have been put into Akron buildings this year.

THERE is some talk of moving the Norwalk shops of the Lake Shore & Michigan Southern Railway to Elyria or Berea, so as to render them more accessible to the Sandusky division of the road. A good site has been found just east of Olmsted Falls and near Berea.

THE capacity of the Akron Iron Co.'s rolling mill, Akron, has just been increased 40 per cent., at an expense of $35,000 to $40,000; the steam capacity is now 1,000-horse-power, an increase which will necessitate a force of 325 men, with a monthly pay-roll of $20,000

THE excavation for Messrs. Seiberling's mammoth mills, Akron, is well under way.

THE Victor turbine has already obtained a foothold in a number of foreign countries, and the makers, the Stilwell & Bierce Mannfacturing Co., Dayton, have lately shipped wheels to England, France, New Zealand and other distant parts.

EAST Liverpool pottery firms have recognized the Knights of Labor and restored old wages, and the men have gone to work.

INDUSTRIES IN GENERAL.

THE Lake Superior Native Copper Works, at Houghton, Mich., are erecting a new rolling mill of double the capacity of the present one, and it will be supplied with all modern appliances for the rapid and economical transformation of the native metal into the manufactured article.

WE have received from the well-known house of Merchant & Co., of Philadelphia, a copyrighted list of makers' brands of tin plates, which they have issued for the guidance of buyers. The list is arranged alphabetically under the headings "Charcoal and "Coke," and there is carefully excluded from the list the names of all private brands and of those supplied by makers to one customer only.

THE Pulsometer Steam Pump Co., New York, Boston and Chicago, have recently filled a telegraphic order from Portland, Oregon, for three of ther largest "New Pulsometer Pumps" for use on the Northern Pacific Railroad; also one from California for a 130,000 gallon per hour pump; also one from Denver, Col., for a large one to be shipped by express. This company is daily in receipt of telegrams for pumps. They have recently shipped several to South America and Mexico for irrigating purposes, and are now filling an osder for six from Cuba for plantation sugar-house pumping. Their business is increasing 100 per cent. every three months, which necessitates constant increase of manufacturing facilities.

MARSH, HARWOOD & Co., heavy chemical manufacturers of Cleveland, O., who located a branch warehouse in Chicago, last May, finding it necessary to erect works there, have bought the old Gage & Horton foundry property at a cost of nearly $30,000, and will at once erect works costing $150,000. This structure has been rendered necessary to meet the heavy demands of the trade.

THE Nicol and Burr Manufacturing Co., of Peoria, Ill., formerly Nicol and Burr, have been incorporated, with a capital stock of $80,000; object, to manufacture boilers, castings and machinery.

THE "Central Support Car Truck Co." has been incorporated in St. Louis, with a capital stock of $300,000. The company will engage in the manufacture of three truck freight cars.

THE Hudson River Power & Pulp Co., Mechanicsville, N. Y., are erecting a dam of grouted masonry, 1,000 feet long, 16 feet high, 18 feet 2 inches wide at the base, which will place 4,000 horse power at disposal. The canal built in connection will be 700 feet long and 100 feet wide.

OUR New York correspondent writes: The Harvey W. Peace Co., (limited) Vulcan Saw Works, 10th and Ainslie street, Brooklyn, N. Y., employ 130 hands. The business has been carried on for 22 years. The largest shipments are made to the West, but the company has also a good Eastern trade. Their buildings cover a large tract of land, and are three and four stories high. The engine which runs these works is 180 horse power. In all departments I found the greatest activity; trade never was better. The works rank second in magnitude to any of the kind in the United States.——The Gutta Percha & Rubber Manufacturing Co., who have their works in Brooklyn and their offices 23 Park Place, New York, were established in 1855, and employ 200 hands.

SCIENCE AND INVENTION.

EQUALIZING DRIVING POWER OF COILED SPRING.—A patent lately taken out for a regulating wheel, driven by the coiled spring has a spiral row of perforations on its face from near its center to its periphery. A spur wheel, whose teeth engage with the spiral perforations, slides upon a feather upon its shaft, and the outer end of the shaft is provided with a gear wheel which engages with a train of wheels, through which the power is applied to the machine to be driven, with a gradually increasing leverage as the force of the uncoiling spring decreases.

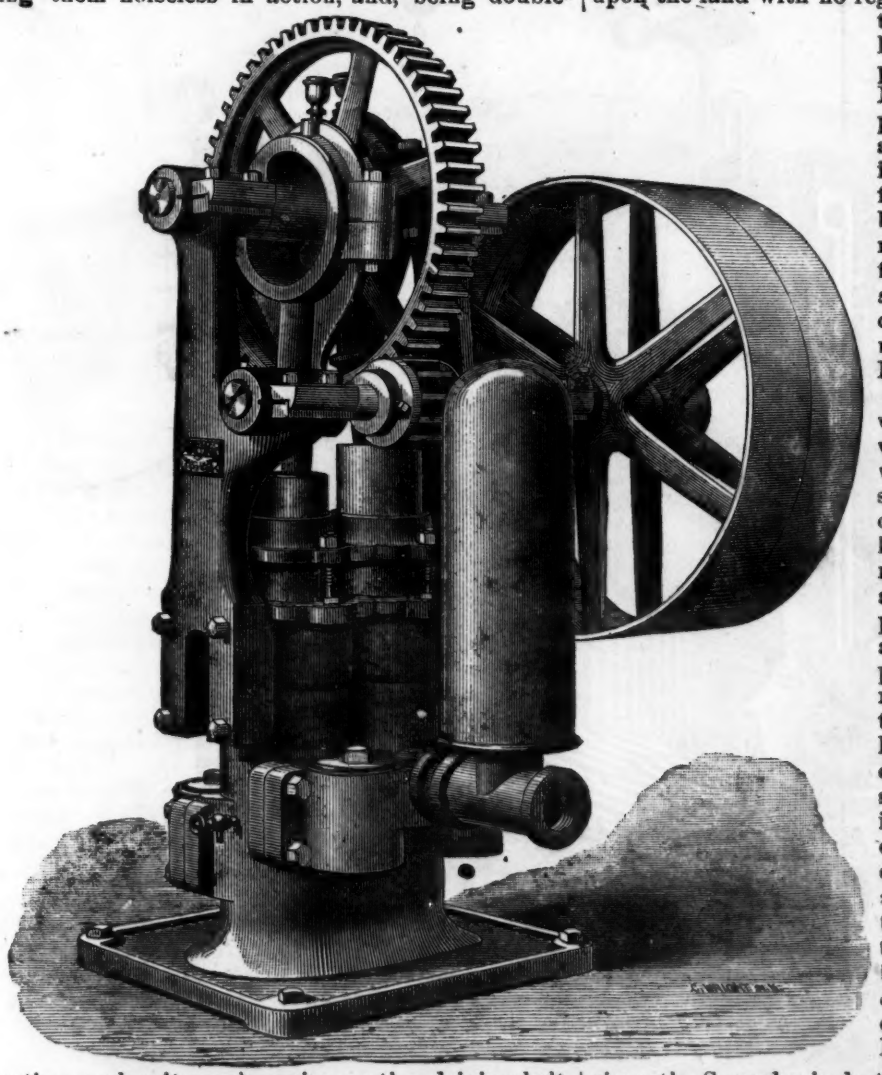
IMPROVEMENT IN SHOVELS.—An improvement in shovels has been patented by Mr. Robert T. Petti bone, of Wyoming, Pa. The back strap is shaped to fit the sides of the socket formed in the blade for the handle, so that the middle part of the strap forms the back of the socket, while the edges are bent backward, as straight flanges, which being riveted to the sides of the handle socket, leaves the back strap flush, or nearly so, with the blade.

INSTANTANEOUS FORMATION OF STEAM.—Messrs. Serpollet, Freres & Co., of Paris, have patented an invention for the instantaneous formation of steam, which permits of its use at once in the cylinder of the engine. A pump sends the required quantity of liquid between two plate surfaces, which are heated, and between which there is only a capillary space. The liquid spreading in a thin layer evaporates at once, without going into the so-called spheroidal state, and this steam acts in the cylinder as fresh formed steam. The speed of the pump is regulated by the engine, the pump being connected with the shaft of the engine.

ECONOMIC BOILER AND TANK FEED PUMP.

I. B. Davis & Son,
HARTFORD, CONN.

On a late visit to the boiler and pump works of Messrs. Davis & Son, Hartford, we were highly gratified at the activity prevailing, constituting one of countless evidences of the appreciation extended by manufacturers to good workmanship and sound, scientific construction. The boiler and tank feed pumps here made, and which are more or less in use in every State of the Union, are of a most effective design, made of the best materials, and are put together in the best manner. We subjoin an illustration, a glance at which will show to every mechanic the arrangement of working parts. The pump is driven by a belt, which on all hands is acknowledged to be the most economical mode of operating a pump supplying steam boilers with feed water. Steam users, who have most closely studied from a comparative point of view methods adopted of driving such pumps, accord to the belt an amount of relative saving which would astonish a host of engineers and manufacturers. The pump was patented in May 1879. As will be seen, it is double, having intermediate shaft and gears, and is complete in itself, ready to work by attaching the feed pipes to and from it and putting on a driving-belt. The four valves, the only parts that can get out of order, are so constructed that they can be got at by simply unscrewing a brass cap. The gears are made from cut iron patterns, rendering them noiseless in action, and, being double-



acting, makes it much easier on the driving-belt, and its action much smoother, and also makes its cost for the same capacity and workmanship much below any single-acting pump. It is especially valuable in sandy or muddy water, as the plain valves can be ground in by any one in a few minutes, rendering them as perfect as when new. The pumps made are in two styles, one for pumping hot water, the other cold water. The latter has a special feature not possessed by other cold water pumps constructed for similar purpose, that it will draft water from 20 to 25 feet and pump to its full capacity. Davis's pump is the only double-acting geared pump, is geared five to one, and has the merit of being compact and systematic in design. It is ready to run by simply connecting feed pipes to and from it and putting on a belt. The arrangement of working parts evidences durability, and we may add that these parts are interchangeable. The make of the pump and the capacity of the works, enable the firm to quote prices below a number of excellent pumps on the market of equal make and capacity, as shown by the price list before us with table of capacity. The firm has been established ten years.

KEMP'S MANURE SPREADER.

Kemp & Burpee.
SYRACUSE, N. Y.

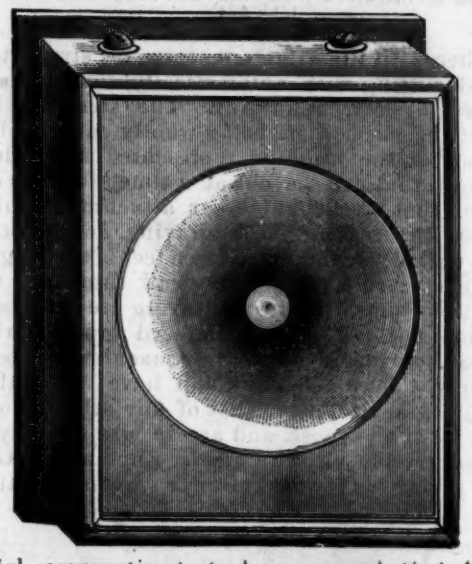
It is said that the manure pile is the farmers bank; certainly upon it depend his crops and his success in farming. No farmer has manure enough; he can always find a profitable use for more; therefore his most earnest effort should be to employ what he has to the best advantage that he may get all the good there is in it. How best to do it is the question to be solved. Professor Stockbridge, of the Massachusetts Agricultural College, who stands at the head of American authorities as to manures, their properties, and how to use them, lays down "the law" in regard to the application of manures as follows: The more thoroughly manure is comminuted, and the more evenly it is distributed through the entire surface soil, the more effective will it be in producing a rapid growth and large crop. The greater the number of soil particles in contact with the manure, or the more thoroughly the soil and manure are intermingled, the greater will be the quantity of plant food developed; and the great gain is, the food costs nothing but the labor of distributing the manure properly. For this reason, to throw manure upon the land with no regard for its even distribution, results in losing a large part of its value as plant food. Kemp's Manure Spreader accomplishes the desired object, an engraving of which is shown herewith; transforming what has always been the roughest and most severe labor of the farm, to one of the easiest and most speedy processes of farm work, with mechanical precision. It is simply a machine cart, holding an ordinary wagon load, having large wheels with broad tire, with suitable gearing for slowly moving the bottom or apron carrying the load to the rear against a rapidly revolving cylinder armed with teeth, which pick the manure in pieces and scatter it in fine particles as the team moves along. The driver throws it into gear by a lever, and it throws itself out when the load is spread. No machinery is in motion when going to or from work. It will thoroughly and evenly spread all kinds of manure found on the farm, from the coarsest to the finest, including ashes, lime, &c., wet or dry, in any quantity desired per acre. From the testimony given the Spreader is destined to take equal rank with the mower and reaper. It is made by the Kemp & Burpee Manufacturing Company, Syracuse, N. Y., who will send illustrated catalogue with full particulars to all applicants.

Stopping Machinery Promptly.

It is often desirable to be able to stop machinery at once, without the delay of sending word to the engineer. This is especially the case in the event of an accident, A method of accomplishing this, is in operation in the Dominion Bolt Works, Toronto, Canada. A weight is attached to the stem of the throttle valve of the engine by a wire rope, the weight being held in place by a rest. Electric wires, leading to all parts of the building, are connected with the rest by mechanism such that the passing of an electric current over the wires releases the rest, letting the weight fall, which shuts off the steam instantaneously, and stops the machinery. Electric buttons, by which the current is manipulated, are placed wherever desired.

Something New In Telephones.

The telephone is indisputably one of the most marvellous and useful inventions of the nineteenth century. It practically annihilates space, materially facilitates commercial and social intercourse, and is a now a well-nigh indispensable factor in the affairs of business men. Unfortunately, the Electric telephone, like the telegraph, has fallen into the hands of the giant monopoly, whose "Rental fees" are often justly characterized as "enormous." The unreasonable fees demanded by the monopolists have tended to restrict the nse of the electric and magnetic telephones. Thousands of business and professional men throughout the country have felt the need of some cheap and reliable means of instantaneous communication with distant points. But nothing durable and reliable except the expensive Bell telephone, has hitherto been offered to them. This widespread demand is now well supplied by the improved mechanical telephones, recently invented by Messrs. Holcomb & Co., of Cleveland, Ohio, engravings of which we present in connection with this article. Careful and im-



partial comparative tests have proved that these new instruments are the king of mechanical telephones. They transmit messages with almost electric speed, and reproduce the original tones with marvellous clearness and fidelity. They are admirably adapted for business purposes, and are entirely adequate to the demands of all who desire to establish private telephone lines. Unlike many other instruments of this class, these telephones are reliable at all times. They are not liable to get out of order, and will last for years.

These telephones are manufactured from the finest resonant wood, selected on account of its peculiar acoustical properties, and great beauty. The various parts are fitted together with the utmost care, each section being in a state of high tension, so as to render it very sensitive to acoustical disturbances. Extended experiment by the inventors has demonstrated that two large concave diaphragms are far more efficient than a single one. Therefore, in their instruments they use two diaphragms of that form, a sounding board which amplifies the normal volume of sound being placed between them. These telephones are constructed in strict accordance with the known laws of coustics. They are finished in a superior manner, and are durable in every part. They require no battery or additional machinery and will work admirably lines two miles or less in length. They contain double concave diaphragms, intermediate vocalizing chambers and adjustable tension gauge and other improvements not to be found in any other machines. Messrs. Holcomb & Co. sell these instruments at very low rates, exact no royalty or license fees or rentals, and guarantee every instrument to be as represented. They are the sole manufacturers of these instruments, and of the galvanized steel cable wire and patent insulators used with them.

Messrs. Holcomb & Co. have also invented and patented an automatic telephone for short private lines. It requires no battery or complicated machinery, and can be readily operated by any one.

Our illustration presents an excellent view of this little device. In order to increase the efficiency as well as the beauty of these telephones Messrs. Holcomb & Co. have recently added to them a nickel plated metal base, and have also enlarged the diaphragm which is electrically and acoustically insulated, to secure

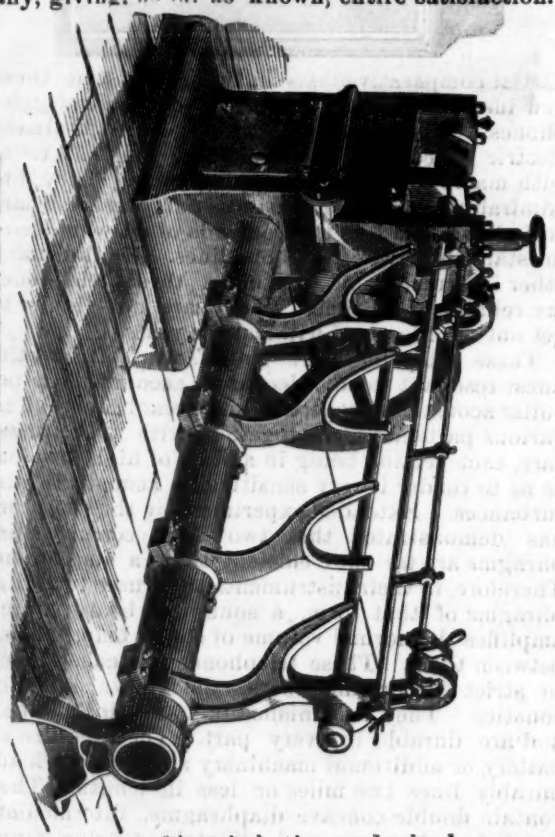
greater clearness and volume of tone. Reports from twenty-three different States where the Holcomb apparatus is in use, all speak enthusiastically in its favor. All parts of these telephones are protected by United States and foreign patents. The inventors are vigorously pushing the claims of their instruments, and business men who are in need of telephonic apparatus will do well to consult them. All communications addressed to them at the Atwater building, Cleveland, Ohio, will meet with prompt attention. They will cheerfully furnish upon application as above, price lists, illustrated circulars, testimonials, and any further information which may be desired.

WIRE STRAIGHTENING AND CUTTING MACHINE.

John Adt.

NEW HAVEN, CONN.

We herewith illustrate a machine for straightening and cutting wire automatically, invented and patented by Mr. John Adt. The straightening and cutting mechanism being wholly contained in the body of the machine, represented at the left, the length that can be cut at a time depends entirely on that of the guide bar attachment which occupies the rest of the engraving, and is practically unlimited, though sixteen feet is the longest for which there has been any call thus far; the proportions shown in the engraving are for about a five foot cut. Though introduced to the market less than four years since, these machines evidently supply a long felt want, and have met with a rapid sale, far exceeding that of any other known device for the purpose, and are in use not only in this country but also in Canada, England and Germany, giving, as far as known, entire satisfaction.



WIRE STRAIGHTENING AND CUTTING MACHINE.

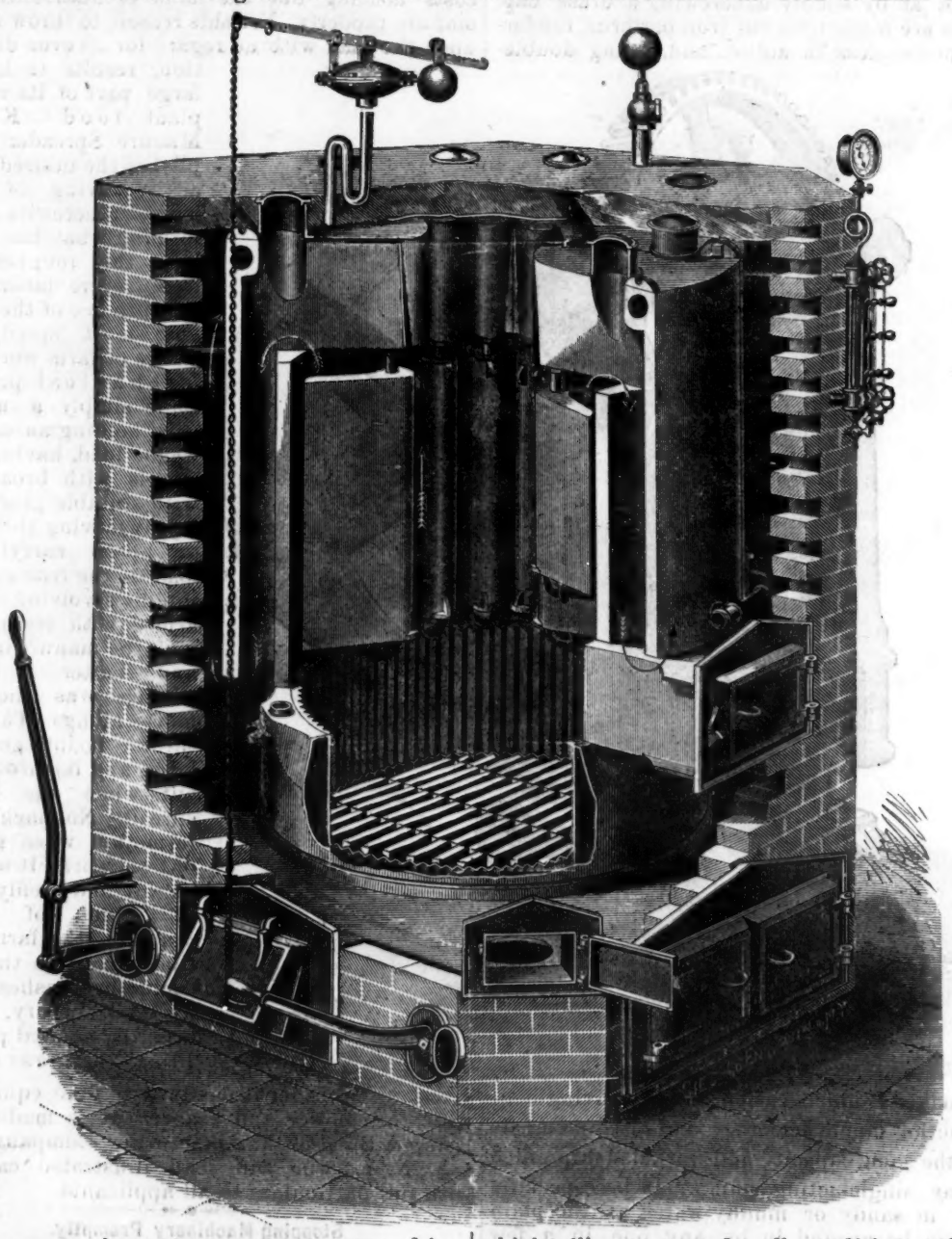
Manufacturers of hay bale ties and check rowers, as well as all others who cut up wire in quantities, find them indispensable, and it is safe to predict a great demand for them in the future. They are built by the inventor, who has probably done as much if not more than any other one man to promote the interests of hardware manufacturers and users, by the introduction of labor-saving machinery, to which he has devoted more than a quarter of a century of his life. His catalogue, which is sent free upon application, contains illustrations of some of his many inventions and improvements in this line, but quite a volume would be required to describe them all, as he has taken out nearly forty patents, and many more were never patented, but given to the public free from the first. Commencing with nothing but his brains and hands, he has built up, at New Haven, Conn., quite a successful business in spite of the late panic. The reader is referred to his advertisement page 22 for particulars.

THE JOY STEAM HEATER.

The Joy Steam Heating Company.

TITUSVILLE, PA.

A careful writer* in a recent work upon the subject of "Steam Heating for Buildings" makes this forcible statement: "A low pressure gravity apparatus is the most healthful, economical, and perfect heating appliance known, and may be constructed to heat a single room, or the largest building, with a uniformity which cannot be attained by any other means." The truth of this proposition is coming to be generally recognized. Gradually the ruder devices for warming our dwellings have given place to other and more efficient appliances, until the value of steam as an agent for heating both private and public buildings can no longer be questioned. By those at all familiar with the subject, the claim is at once allowed; while those who still look upon steam as an agent of marvellous power only, who still regard its use for domestic purposes with fear and trembling, and dread its introduction into their dwellings, to be handled by servants, having no mechanical skill, and no knowledge of machinery; as they become acquainted with the simple principles which underlie its action, and know more of the appliances by which its use is rendered both effective and safe, will cease to treat it as a mysterious agent to be feared, and will give it the consideration which its great merits deserve.



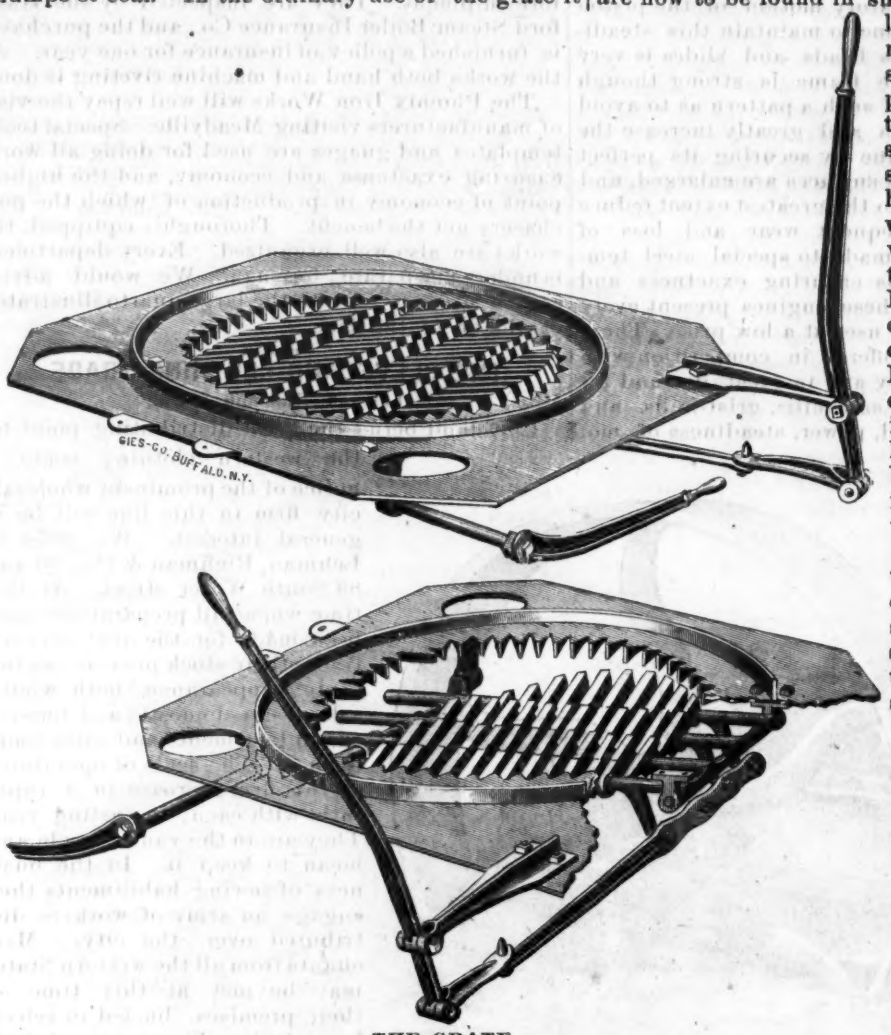
The accompanying cut represents a new and improved steam heater, for warming houses, churches, and other public buildings, which is being received by the trade with great favor, while those who have them in use cannot speak in too high terms of their excellence. We append a brief summary of a few of the claims made by the manufacturers which we commend to the careful consideration of our readers. The fire box to this heater is ample in size and of sufficient depth to insure great staying power. Its inner wall is corrugated, thus doubling its fire surface. The fuel rests against the apex of the triangular corrugations, does not cinder as when resting against smooth water surfaces, and combustion is most active at the outer rim of the fire.

The V shaped chambers with the inward projecting dome, present immense surface immediately overhanging the fire. The return or diving flues are large and oval in form, and while presenting great surface do not impede return drafts as do wrought boiler tubes of ordinary sizes. The highest economy in use of fuel is obviously attainable upon two conditions, viz: first, a perfect combustion of gases, and secondly a sufficient fire surface to utilize the products of combustion in their passage to the chimney flue. Upon this head the manufacturers of the Joy Heater claim—first, the draft spaces formed between the V shaped corrugations of the fire box, and an ample combustion chamber insures the most perfect combustion of all gases, while the immense surface presented to the direct action of the heat, and over which the draft currents are distributed, insure under all conditions a maximum evaporating power.

In the matter of economy of fuel the Joy Steam Heating Co. claim a much larger ratio of fire to grate surface than is given by other manufacturers. That this larger ratio is necessary to obtain most economical results has been demonstrated by many tests under a great variety of conditions, including the reduction of a portion of fire surface. The heater will evaporate 9½ to 10lbs. of water with 1lb. of coal and with sections shortened, 8 to 8½lbs. The aim of the manufacturers has been to make a boiler which will operate under all conditions, while possessing the maximum of evaporating power.

The new improved grate which the company have recently added to their heater is at once so novel and attractive that we supply a description. The grate consists of parallel bars, with projecting cross bars arranged to conform to the opening in the base plate, which in its turn is notched to conform to the corrugations of the fire pot. Depending from the grate bars are arms, connected to a parallel vibrating bar which is also connected by an adjustable link with the perpendicular shaking lever as seen in figure 2. When the grate bars are in place, as in figure 1, they are confined to a limited vibration by means of stops, but when in a dump posi-

tion may be tilted upon their edge. The ends of the cross bars are notched or toothed for the purpose of reducing slate and clinker, and yet, as is seen in figure 1, the notches form a stop or guage underneath the teeth so that while slate or clinker will readily fall under them in the vibrating motion of the grate the same will not be true of large lumps of coal. In the ordinary use of the grate it



THE GRATE.

will be found that a very slight motion is sufficient to free the grate from ashes and that full vibration of the grate bars should not be resorted to unless to free the grate from an accumulation of slate and clinker. The parallel grate bars rest in grooves upon bearing bars supported by lugs depending from the base plate. The front bearing bar is a crank which, when turned as in figure 2, causes the grate bars to incline thus making it easy to introduce a cleaning rod if found necessary; or when it is desired to dump the grate the bars in the dump position can be readily tilted upon their edge in such manner that the coal will fall between them to the ash pit. In this position also any of the bars may be easily removed and new ones substituted, as when from neglect or carelessness a bar has been allowed to warp or burn out.

*Wm. J. Baldwin, Steam Heating Engineer.

The Largest Leather Belts.

The largest belt ever made from a single width of hide is said to have just been made by the Jewell company of Hartford for a New York flouring mill. It is forth-eight inches wide, ninety-six feet long and weighs one thousand pounds.—*Buffalo Express.*

The Hartford *Evening Post* says that the Jewells are now making two still larger belts than the above for one of the largest rubber factories in the country. One is 48 inches wide and 120 feet long, the other is 44 inches wide and 150 feet long, both double thickness. These are the largest belts that can be made from a single hide, as no hide can be solid and thick more than four feet in width. It is but a few years since belts of these proportions could be made, or pulleys on which to run them, and in no country but this is it done now.

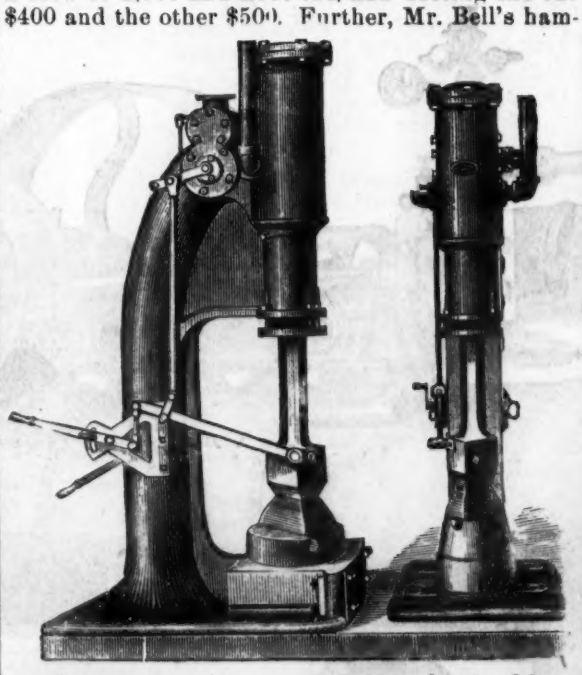
The establishment of Messrs. Jewell is one of the most extensive and best organized in the world. In the production of good belting many processes are employed requiring great skill and experience. Those who wish to acquaint themselves with the details of this peculiar industry should examine the series of engravings and descriptions of the Jewell establishment published in the *Scientific American* of February 14, 1880.

STEAM HAMMERS.

David Bell, Steam Engine Works,
BUFFALO, N. Y.

The steam hammer, itself a modern novelty, has become a general adjunct to mechanical labor in all operations of hammering requiring graduated weight, quietly repeated blows and precision. They are now to be found in smiths' shops as well as in large forges and rolling mills, but with smiths' shops, the cost and complicated arrangements of those that have been constructed, requiring special skill for management, have interfered with their wider use. There are advantages which may cost too dearly. Mr. David Bell, the eminent builder of iron ships, and yachts. engines and boilers, of Buffalo, N. Y., noting the cause of this restriction in the use of the steam hammer, where it would be serviceable in finishing by machinery and in vise work, &c., applied himself to construct one that would meet every requirement of the smiths' shop, aiming especially at simplicity of construction, combined with strength and automatic movement, and that could be worked as occasion offered, manually or otherwise. That he has succeeded in this is evident from a view of the steam hammer of his invention and construction of which we present three designs.

Bell's Steam Hammer has a single column standard which, with the cylinder and bed plate, is cast in one piece; the die block being cast separately, it is strong, self-acting and takes steam at both ends of cylinder. The cylinder diameter is 10 inches; the stroke or lift 22 inches, and it will strike a blow of 6,000 lbs. The average diameter of shaft, which it will easily beat out at a single heat, is 7 inches. The price is $700. Two smaller sizes of steam hammers are made, having respectively 16 and 20 inches lift, and delivering a blow of 2,000 and 4.000 lbs, and costing the one $400 and the other $500. Further, Mr. Bell's ham-

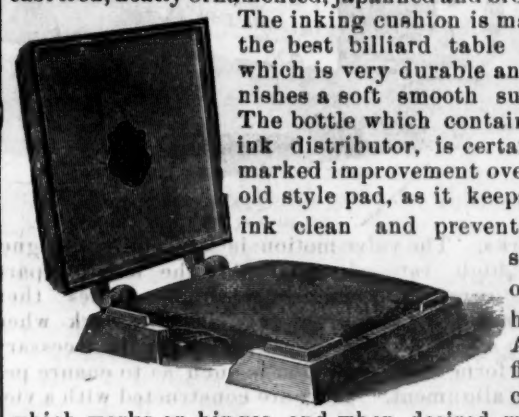


mer is economical in use, and its value in this respect and ready efficiency, is testified to, as shown by testimonials before us, from foremen, black smiths of leading establishments and eminent engineering firms throughout the country. With reference to one of the hammers sent to Chicago a few months ago, the owner says: "It works beautifully, and I would not exchange it for the best hammers made." Indeed this is the universal opinion of everyone who has tried it. Now that Mr. Bell has so completely suited the steam hammer to the ordinary smiths' work, the saving of wages, time, fuel and material, with improved execution realized, must cause the almost universal introduction of his invention in these establishments. Everywhere it appears to have done valuable service, and has been classed not only as a useful but first class hammer. The Buffalo Car Works, Buffalo, N. Y., state that No. 3, which they use, presses into shape, without striking a blow, the bars and other iron work required for freight and passenger cars and that they find it invaluable for the purpose and earnestly recommend it. Mr. Bell has been established in the iron construction business for upwards 40 years, and employs upwards of 70 hands.

MICHAEL'S PATENT DESK PAD.

A. M Michael.
ALBANY, N. Y.

Michael's Patent Desk Pad is a most serviceable invention, being perfection itself in operation. A host of inking pads are placed on the market which after short use have to be thrown aside. Michael's Pad will maintain for any length of time the precise degree of flexibility which allows of a clear and satisfactory impression. The stump itself has a flexible action. The ease of operation reduces the work both in time and exertion to a minimum. This inking pad, owing to its undoubted merits should be used in all our national and State legislative halls, municipal offices, public institutions, and offices and business houses. We may thus describe it: The case is made of cast iron, neatly ornamented, japanned and bronzed.



The inking cushion is made of the best billiard table cloth, which is very durable and furnishes a soft smooth surface. The bottle which contains the ink distributor, is certainly a marked improvement over the old style pad, as it keeps the ink clean and prevents the soiling of the hands. A close fitting cover, which works on hinges, and when desired may be removed, makes the pad perfectly dust proof when not in use. We find that the inventor and manufacturer of this admirable inking desk pad has received numerous testimonials from offices, governmental and private, having this pad in use, testifying to its excellence. Its convenience in use is especially dwelt on, also its neatness in keeping the ink from dust, and the fingers from soiling and for its durability. All users appear to concur in the statement that it is the best thing of the kind they ever had, and no one has as yet suggested any possible improvement.

Cheney's Combined Anvil and Vise.

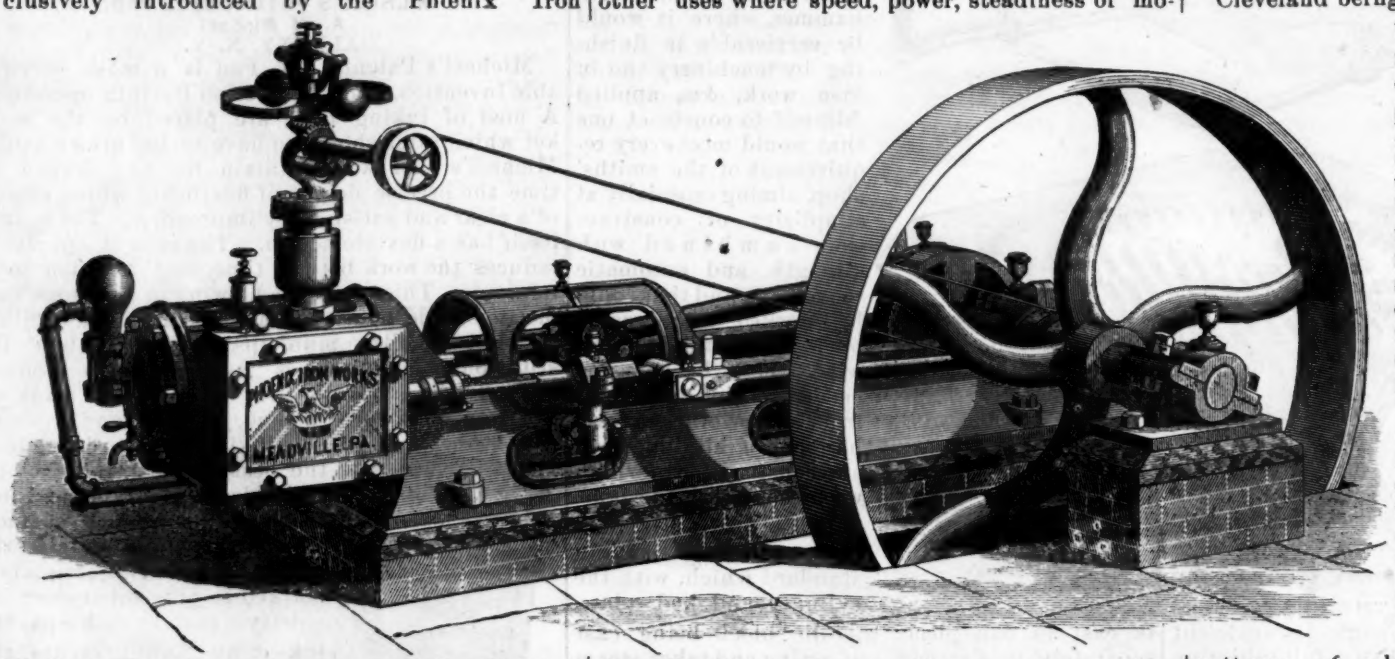
The Cheney Anvil and Vise Co., whose office is at 36 Moffat block, and their factory at 54 Bates street, Detroit, Michigan, are making heavy sales of their combined anvil and vise with adjustable jaws. The tool, an admirable one of its kind, is made in four sizes. No. 1 is adapted for use of jewelers, amateurs, boys or any one who wishes a small, strong, and convenient tool. No. 2 is a household tool, and supplements hammer, rivet, and nails in making repairs, or doing anything in the mechanical line. Nos. 3 and 4 are for general use. As stated in the prospectus it is really a combination of three tools, namely: an anvil having a chill hardened and polished face; a parallel vise with a square thread, wrought iron screw and jaws that are steel-faced; whilst lastly it becomes an adjustable vise that will hold odd shaped articles as shown in cut, by removing the steel pin. The adjustable jaw may be entirely removed from face of anvil if it is desired to use the whole surface for any purpose. All classes of workers will find this vise useful on account of its adjustability and capacity.

ENGINES, BOILERS, AND CIRCULAR SAW MILLS.

The Phœnix Iron Works.

MEADVILLE, PA.

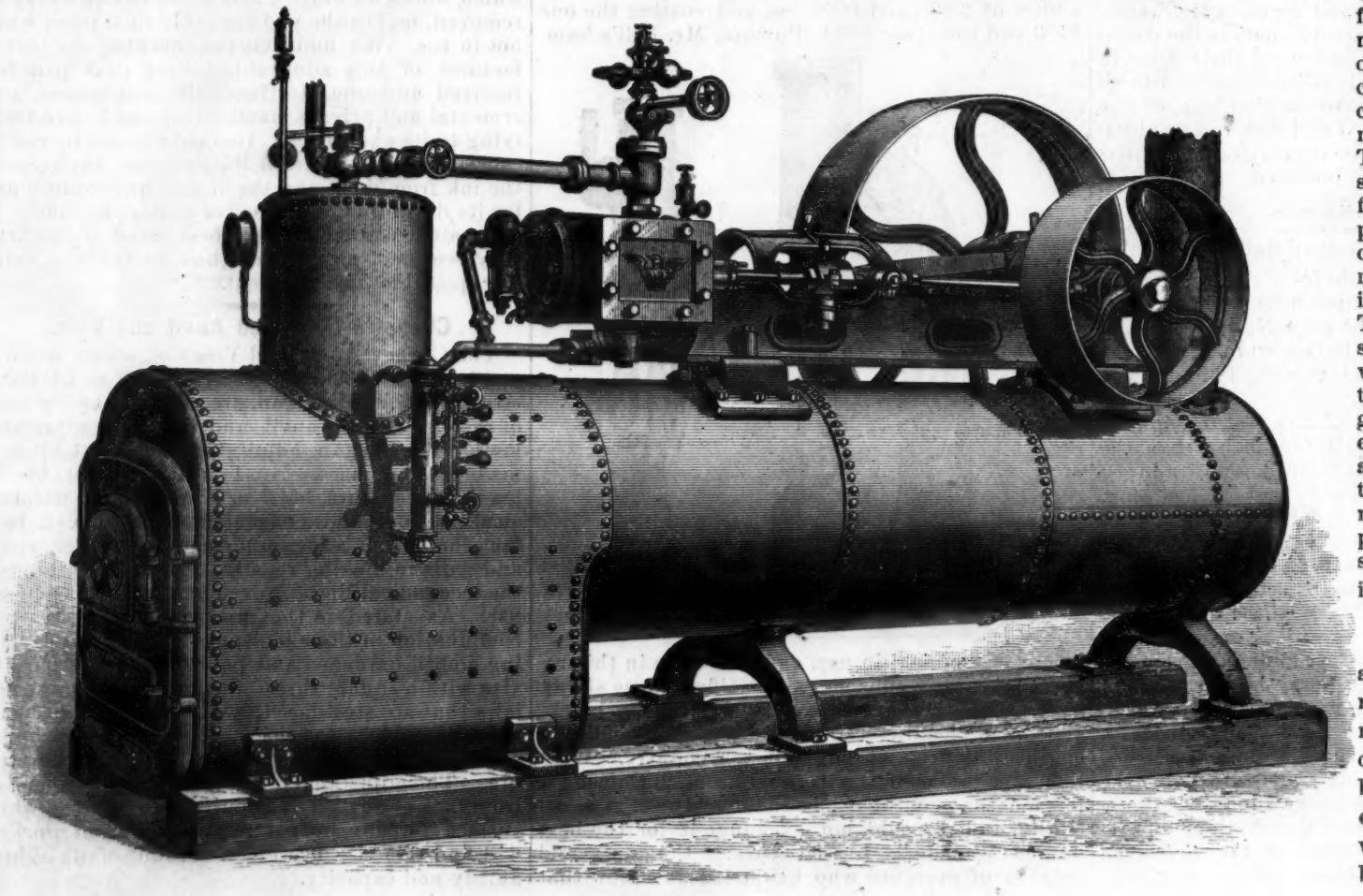
The Phœnix Iron Works, Meadville, Pa., have a long established and growing reputation, dating from 1865, for the manufacture of the "Phœnix" stationary and portable engines and boilers and circular saw mills. The works which are on the N. Y. P. & O. and the Meadville railways, have switches running into them from each road. They give steady employment to 125 hands, and are fitted up with the best labor saving machinery to which constant additions are being made. At the time of our visit we found that a new riveting machine had just been placed in the boiler shop to meet the increasing demands of trade. The present capacity of the works is 250 engines and boilers per annum. There are here manufactured no less than nine sizes of stationary engines from 15 to 100 horse power and twelve sizes of portable engines. We here present an illustration of their stationary engine. These engines are built from entirely new and improved patterns, are very compact, strong, simple in construction, and of the best materials and workmanship. They contain many new and valuable features exclusively introduced by the Phœnix Iron



Works. The valve motion is especially designed for high rate of speed. All the moving parts are carefully balanced which makes them desirable for running any class of work where high speed and steadiness of motion is necessary. The form of construction is such as to ensure perfect alignment. They are constructed with a view to withstanding the effects of heavy and intermittent wear, in the simplest manner consistent with efficiency, and at the same time include every improvement in construction that will add to their utility. The engines are especially designed for a high rate of speed. The cross head is a new and valuable feature, being such as to obviate friction, to lend the greatest possible rigidity to the reciprocatory motion of the piston rod, and at the same time to maintain this steadiness, wear in the cross heads and slides is very readily taken up. The frame is strong though not cumbersome, and of such a pattern as to avoid jar to the working parts and greatly increase the durability of the engine by securing its perfect alignment. All wearing surfaces are enlarged, and of such metals as will to the greatest extent reduce friction, with its consequent wear and loss of power. All parts are made to special steel template and gauges, thus ensuring exactness and perfect uniformity. These engines present every advantage to the steam user at a low price. These engines, in short, are offered in competition with any good engine. They are in great demand for running electric lights, saw-mills, grist-mills, and other uses where speed, power, steadiness of motion, durability and economy are required. They are shipped to all the States and Territories, to the West Indies and to South America. The proprietary have agencies in all the principal cities and distributing points. The accompanying cut illustrates the portable engines and boilers. The portable engines are made with center cranks, and can be taken off the boiler and placed on a foundation, the boiler saddle being made separate from the engine. The design is neat simple and durable. A preferenceis given by the manufacturers to large tubes as ensuring less liability to choking up and impeding the draft than smaller tubes.

The boilers are made with the greatest care, of the very best materials, and thoroughly tested before shipment. They are inspected by the Hartford Steam Boiler Insurance Co., and the purchaser is furnished a policy of insurance for one year. At the works both hand and machine riveting is done.

The Phœnix Iron Works will well repay the visit of manufacturers visiting Meadville. Special tools, templates and guages are used for doing all work, ensuring exactness and economy, and the highest point of economy in production of which the purchasers get the benefit. Thoroughly equipped, the works are also well organized. Every department is under a separate foreman. We would advise engine users to refer to the large quarto illustrated catalogue of the firm.



THE CLEVELAND CLOTHING TRADE.

Lehman, Richman & Co.,

Cleveland being the great distributing point for the western clothing trade, a notice of the prominent wholesale city firm in this line will be of general interest. We refer to Lehman, Richman & Co., 86 and 88 South Water street. At this time when full preparations have been made for the next season's trade, their stock presents an imposing appearance, both wholesale pieces–domestic and imported, and garments and suits ready for use. The scale of operations of this firm increase in a rapid ratio with each succeeding year. They are in the van of trade and mean to keep it. In the business of sewing habiliments they engage an army of workers distributed over the city. Merchants from all the western States may be met at this time on their premises, busied in selecting stock. The next winter's fashions will run on fancy patterns, of which the firm have certainly ample variety. The first floor of the large edifice is devoted to piece goods and tailors' trimmings; the second is the mens' stock department; the third that of children and youths' suits, also overcoats; the fourth is the shaping, cutting, and shrinking department. Here may be seen a powerful machine cutting out the cloth for tailoring purposes. It makes "no bones" of cutting out twelve thicknesses of cloth at once, moves with celerity and works with mathematical exactitude. There are a number of designers of patterns on this floor. Here too the pieces previously to cutting are accurately examined, so that not the slightest flaw may be introduced into the garment. The sponging machine is seen in operation doing the work of shrinking. One portion of this spacious floor is given up to the button workers. The practical experience and commercial rectitude of the firm have built the business up, a business which promises in the future to be second to none in magnitude in the country.

A new glass, transparent and more brilliant than common crystal, but containing no silex, potash, soda, lime, or borax, has been invented by a chemist in Vienna. It can be cut and polished, and when fused adheres to iron, bronze and zinc.

BURDETT ORGAN COMPANY, LIMITED.

ERIE, PA.

The Burdett Organ has now a reputation unequalled in extent by its admirable qualities. Its manufacturers, have done more to popularize the organ,—to place it within reach of the masses, than any half dozen organ firms combined in this country or Europe. With great power, its brilliancy, extreme sweetness and mellowness of tone, rare characteristics in the most costly organs, and on this account and that of its portability, as well as its maintaining its tones unimpaired through a long course of years, and resisting the effects either of changing or extreme temperatures, it has been found the most serviceable both for private use and devotional purposes. So far as style is concerned every requirement is met, as shown by the illustrated catalogue of the Co. The organs rise from six to nineteen stops with proportional sets of reeds. Style 2, for instance, with eight stops, five octaves of keys, and eight stops, named: 1, diapason; 2, cor. anglais; 3, forte; 4, melodia; 4, celeste (or flute); 6, echo horn; 7, euphone echo; 8, cremona. The sub bass, octave coupler, or vox humana may be had in this and several other styles. Every capacity of the organ is brought out in the various makes produced. The lengths are under and over four feet; height from upwards of four feet and six feet, and general width twenty-four inches. We append an illustration of one of the latest styles of the Burdett organ, which will

not fail to impress our readers with the high artistic taste applied to workmanship, recommending it apart from musical qualities, as a contribution to decorative furniture. To realize the capabilities of the Burdett Organ, and the enjoyable character of the tones, remarkable for purity, sweetness, power, richness and depth, and harmonizing perfectly with the voice, it should be heard played by a capable performer in church, school or concert. From a host of testimonials we select one from Naples. Writing from that city of song, famed for its instrumental music, the Rev. Dr. J. C. Fletcher thus refers to the one given to the Waldensian church community by the Erie Central church Sunday School: "Tell the Burdett Organ Company that their organ is splendid and is considered the finest one of the kind in Naples. It has won golden opinions here. We have listened to it ourselves, and can say confidently we never heard a sub-bass come in as smooth." All styles of this organ has combinations which the most eminent musicians admit are not found in any other organ. It is no matter of surprise that over 52,000 organs should have been sold. Considering the variations of musical taste, this concurrence of opinion is a splendid testimony to its merits. It would be impossible to name any civilized country to which shipments are not made, not excluding China; and as valuable in supplementing missionary work they are to be met with among barbarous tribes in the most remote regions of the globe. From the first there has been a steadily progressive demand for these organs. An effort is being made to turn out Burdett organs enough the present year to meet the enormous demand for them, as shown by unfilled orders. Over one hundred expert workmen are employed. This most substantial firm has for its Chairman of the Board of Managers, Mr. R. Burdett, and for its Treasurer, Mr. P. Metcalf; Mr. C. C. Converse is Secretary and Business Manager, and Mr. B. O. Church the Superintendent.

THE SWEETLAND CHUCK.

Sweetland & Co.,

NEW HAVEN, CONN.

The now famous Sweetland Chuck, of which Messrs. Sweetland & Co., New Haven, are the manufacturers, resembles in general construction the universal screw chuck, the jaws being moved to and from the center, universally, by means of geared screws connected with the circular rack which revolves in a recess in the back plate; the front and back plates are bolted together, thus encasing and protecting the gearing. A main improvement introduced by the firm, and which renders it far more valuable, is the making it independent as well as universal. The mode in which the circular rack and pinion screws are connected and disconnected is very ingenious. These bevel cam blocks which correspond with beveled recess at back of rack, have radial motion, and when moved to the outer portion of the recess and rack they connect the gearing, making the chuck universal; and when they are moved inward, allow the rack to disengage from the pinion, thus making each screw independent. The jaws have a long bite, are ground true and are removable. A guide allows of setting the jaws true. One style is known as the reverse jaw. This chuck is used for holding drills, screws, pipes, &c., and is very convenient for this class of work, also for hand-tool work, brass finishing, &c.

THERE was put recently in operation at Pittsburgh a machine for cutting nails from steel wire. An English mechanic, Mr. Taylor, is the inventor, and the funds for the construction of the machine were furnished by Pittsburgh men. It is claimed for the invention that it can cut steel nails at the rate of 15 000 to 40,000 per hour.

AXES AND EDGE TOOLS.

A. G. Peck & Co.,

COHOES, N. Y.

We had lately the pleasure of visiting the city of Cohoes, N. Y., and while there investigated a few of the thriving industries of this purely manufacturing town. Cohoes is admirably located near the mouth of the Mohawk River, and the Cohoes Company, through the development of its immense water-power, has been mainly instrumental in increasing the rapid growth of the place. There are woolen mills, hosiery mills, iron mills, pipe mills, and, in fact, nearly every kind of mill to be found at every turn. The Harmony Mills, manufacturing print cloths, are known all over the world and employ some 15,000 in their various departments. There are three large concerns making axes and edge tools, and not the least prosperous of these factories is that occupied by the firm of A. G. Peck & Co., manufacturing the now well-known brand of "Peck's Champion Blade Axes and Edge Tools," and whose trade extends not only throughout the United States, but to nearly every foreign country, scarcely a week passing without large shipments being made abroad. This export trade, starting some eight or nine years ago, has steadily increased in volume and extent, until it alone exceeds the entire sales of the company not eight years ago.

Although this firm has existed under various titles and names since 1860, its brand took no special prominence with the trade until the proprietorship passed into the hands of A. G. Peck, in May, 1879, when he bought out his partner's interest. "Peck's Champion Blade" was immediately adopted as the trade-mark, and the fall of 1879 being the begining of a boom in hardware, over 144,000 axes and edge tools of this brand were sold in one year. The brand has ever since been popular, and during the year some 200,000 have passed into the consumers' hands.

It has been a matter of wonder to many dealers that a brand should become a standard with the trade in so short a time, superseding in many instances those of long standing and former prominence. This is probably owing largely to the high standard aimed at by the proprietor from the first. His axes and edge tools were to be the best, if care, labor and constant watchfulness could accomplish the result. To effect this no effort or expenditure has been spared; his axes are made by the most competent workmen; Firth's best cast steel and no other is used in their manufacture, and although somewhat higher priced than many other well-known brands, they have a large sale in Wisconsin and Michigan among the lumbermen who want an axe to do good service.

The firm's hatchet trade, including bench or broad hatchets, hunter's, axe pattern, adze and broad axes, has wonderfully increased, until some 1,200 pieces pass through its works every day, and they are now said to be as standard with the trade as Hunt's and Blood's were twenty-five years ago. Before leaving this subject, about which much more could be said did space permit, attention may be called to the fact that Mr. Peck succeeded, after much study and experiment, in producing and introducing a solid steel shingling, half and lath hatchet, which, it is claimed, is beyond all question the best shaped, handsomest and most serviceable tool ever placed before the public. Only about a year has elapsed since its first appearance, and yet it has been impossible for this factory to fill orders for it with any degree of promptness. The firm has largely increased its facilities for the production of this line, and hopes soon to come somewhere near meeting the demand within a reasonable time after entry of orders. Heretofore it has not been possible to ship promptly, orders often being four to five months old before complete for shipment. This hatchet is supplying a want for a first class article at a reasonable price. It is a combination of two steels; the process is patented, and any infringement on the manufacture will be summarily dealt with. A. G. Peck & Co. have the sole right to make goods of this description, and the public are cautioned against buying any other goods made in a similar manner. Peck's solid steel is said to be the best and cheapest hatchet (for the kind) in the market. A. G. Peck & Co. own their factory; its position in regard to power is one of the best in Cohoes. Only skilled workmen are employed; the best of stock is used, and it will probably be only a very short time when, if the present rate of increase continues, the proprietors will have to again enlarge their capacity, already increased to eight times its original size. The cuts occupying an entire page elsewhere in this issue illustrate the lines of goods made by the firm. The first engraving represents the eclipse of 1882, Peck's Champion Blade being the sign in the heavens.

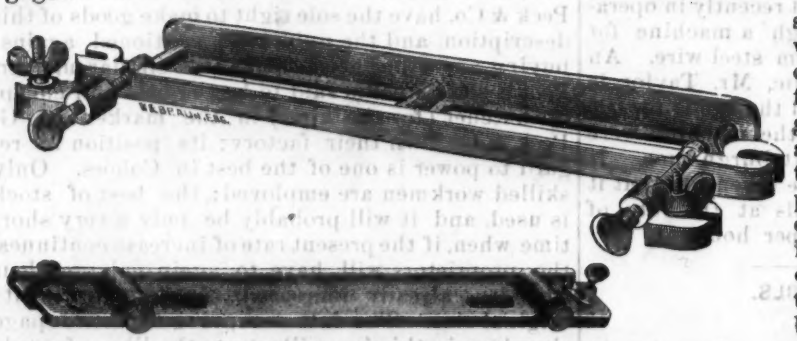
THE largest empire in the world is that of Great Britain, comprising 8,557,658 square miles, more than a sixth part of the land of the globe, and embracing under its rule, nearly a sixth part of the population of the world. In territorial extent the United States ranks third, containing 3,580 242 square miles including Alaska; in population it ranks fourth with its 50,000 people. Russia ranks second; 8,352,940 square miles.

IMPROVED SQUARING SHEAR.

Niagara Stamping and Tool Company,
BUFFALO, N. Y.

The object of our present article is to call attention to a new squaring shear for tinners' can-makers' and others use, recently introduced to the trade by the Niagara Stamping and Tool Co., of Buffalo, N. Y.

It will be observed that this shear has many new and desirable features, among which the following are most prominent. Instead of the usual springs that lift the treadle, this shear has a weight-device which, being very strong and durable is not liable to derangement the same as the spring mentioned. On the cross-head carrying the upper knife there is a hold down or clamp, similar to that of paper-cutters, which comes down upon the tin and holds it rigidly to the table before the knife begins to cut, thus preventing the 'drawing' of the tin. On the back of the shear is a metallic pan into which the tin cuttings are discharged, and on the top of the cross-head is a shelf to receive patterns, tools, &c., while adjustment is being made. A special feature of these shears are the new gages used, which allow of adjustment to the smallest fraction of an inch by means of micrometer screws. We illustrate these gages (both back and front) and will here mention that, to make adjustment, the gages are first slided back and forth upon the brackets or table to within a short distance of the poiht where final adjustment is desired and the gages screwed down tight. Now the micro-meter screws are revolved, thus causing the straight edge to move forward or backward as the case may be, thereby attaining the desired result in the shortest possible manner. When once set these gages are not liable to move accidentally, and therefore are much mors reliable than ordinary gages.



We are informed by the manufacturers that they place these shears upon the market in three different sizes, viz: 22 inch shears for tinners' use, 32 inch shears for stove-pipe work, etc., and 42-inch shears for large work, cornice-makers', etc. We are further informed that the construction of these shears is such as to enable the manufacturers to sell them either plain, that is such as those heretofore sold, with springs and the usual gages, or with any one or more of the above-mentioned attachments and that these attachments (except the clamp or hold-down) can at any time be added to the shear. In regard to the improved gages we may add that they fit any squaring shears, no matter whose make, so that any tinner &c., having a squaring shear without the patented improved gages can avail himself of their advantages by ordering them at the Niagara Stamping and Tool Co., Buffalo, N. Y. In conclusion we will say that this company is largely engaged in the manufacture of presses, dies, and tools for making tinware and especially for manufacturing fruit cans, and we advise our readers who may be in want of anything in this line to write to the company before ordering elsewhere.

THE AMERICAN TRICYCLE.

Manufactured by N. S. C. Perkins,
NORWALK, O.

Mechanical ingenuity has signally distinguished itself of late years in bicycle devices as a means of superseding pedestrianism. Bicycles may be considered as having attained perfection in the way of light build, and yet strong construction combined with ease of management, this class of vehicles being as obedient to the will of the skillful rider as the horse to the rein. Whilst boys and youths freely indulge in this mode of recreation and exercise, mechanicians in the bicycle line have forgotten the girls, who have been doomed to witness their brothers in possession of a source of enjoyment, that of self-propulsion, from which they were excluded. The gallant task of coming to their rescue has been reserved to Mr. N. S. C. Perkins, of Norwalk, O., who possessing in his knowledge of practical mechanics the requisite skill, and as a manufacturer the most ample means, has brought out, to the delight of the young and fair of the gentler sex, the American Tricycle which we here illustrate. In constructive design it is a perfect triumph, affording the rider a comfortable, graceful, and becoming position, and accordingly it is no marvel that in the few years in which the patentee has turned the vehicle out, it should have rapidly made its way in city and country. Made of the best and strongest material, the crank shafts and guide rods being of steel; they are also handsomely painted and varnished, with best carriage finish, being designed for service as well as beauty; but its great attraction is the facility with which it may be propelled in any direction, with but a miuimum of muscular effort, whilst the rear wheel which affords guidance is connected by a crank with the handles to right and left of the rider obeying the slightest impulse. This effect is aided by the circumstance that the rider is seated not far behind the crank axle. The tricycle may be turned in a circle within small compass, and made to run backward when desired, or its course be turned to right or left in a moment. The many testimonials submitted to us by Mr. Perkins, and our own observance of its construction and action on a visit to his works, satisfy us that it is all that can be desired for healthful and enjoyable exercise for girls. It is already extremely popular in Cleveland, and the orders that Mr. Perkins is receiving, even from the most distant States, show that it is destined to universal use. As provider of a new means of pleasure to the young he may be considered in the light of a public benefactor. The fair and fortunate owners having once experienced the delights of this mode of propulsion could not be induced to forego it. As observed by Mr. Perkins in his illustrated circular: "This invention is one from which propriety need not shrink, as it furnishes the holder with a graceful and modest position, while it also admits of the free use of the limbs in propelling the velocipede, and a perfect and easy control of its direction." It remains only to add that it is made in four sizes, from one suitable to a child, to one suitable for a girl 4 ft. 9 in. tall and over. We would advise reference to the illustrated circular of the manufacturer.

TRADE MARK.

CLEVELAND STAINED GLASS WORKS.

CLEVELAND, O.

The Cleveland Stained Glass Works have recently changed hands, and on a visit which we lately made to the establishment we found that our former predictions as to its success have been more than amply verified. Many of our leading citizens have bespoken and had completed some beautiful and artistic specimens for the adornment of their private mansions, and it is gratifying to us to record that the works are equal in design and execution to anything of the kind furnished by New York, Boston or Philadelphia houses who have hitherto enjoyed a practical monopoly of the business. The enterprising manager, Mr. George Drake, who has taken the entire block of buildings, Nos. 99 and 101 Public Square (formerly occupied by the Young Mens' Christian Association,) courteously showed us over the premises, and we were pleased to notice that facilities now exist for carrying out the most extensive contracts. A new cast iron furnace, to replace the temporary brick structure, is now in course of erection, by means of which as large a quantity of glass as can possibly be required under ordinary circumstances for any one structure, even the largest church, can be prepared at the same moment of time; other improvements of an important character are being perfected. As evidence of their necessity we may state that contracts have been entered into for the restoration and decoration of several of our local and neighboring churches, and an important order has been received from the Cleveland, Columbus, Cincinnati & Indianapolis R. R. Co. for stained glass windows to be used for their new and splendid equipment of sleeping and traveling cars. We cordially welcome the introduction to this city of a refined and elevating industry which well merits the support and patronage it is evidently receiving from persons of taste in continuously increasing ratio. Some of our private citizens, among whom we may mention General Leggett, have offered to allow those interested to inspect the windows put up. The designs include landscapes, animal and plant life, and various marvelous combinations showing the most delicate shadings, the finest harmonizing and most effective contrast of colors. Much of the work done by the company reminds us of some choice chef d'œuvres of mediæval times. It is evident that anything within the range of art can be accomplished at the Cleveland Stained Glass Works. Our praise may be thought extravagant by those who have not had the opportunity of inspection. The most skilful artists are employed on the designs which, however elaborate, are faithfully carried out.

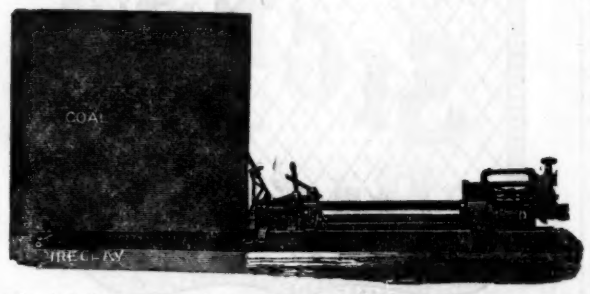
THE LECHNER COAL-CUTTER.

The Lechner Manufacturing Company,

COLUMBUS, O.

The idea of substituting machine work for manual labor in cutting coal has engaged the attention of all those connected with coal mining for many years, and a practical machine has been long looked forward to, not alone as a means of getting coal cheaper, but also as a powerful aid in making operations less dependent upon the temporary goodwill of the miners. While in other branches of mining, railroad tunnel work, and quarrying, machinery has been introduced on an extended scale and has proved invaluable, coal-cutting machinery has not until recently commanded that success which a large and important field would apparently secure to it. The reasons given for this state of affairs are, that coal operators are frequently very conservative, that mechanically the machines constructed were not adapted to the peculiar circumstances to be dealt with in coal mines, and that their introduction meets with a determined opposition on the part of the miners. On the latter point we may state that there frequently have been instances where the machines were wantonly destroyed. But we believe that however much such opposition may hamper progress, it can not and will not arrest it in the long run, and the growing spirit manifested by the miners' unions will drive operators to seek relief by the introduction of machinery. It is generally claimed, in behalf of coal-cutting machinery—and experience, even with the earlier types has borne out that claim—that there is much less waste in undercutting, and that the work of mining can be much more concentrated in one part of the mine, a fact the importance of which will be fully appreciated.

Of recent mechanical inventions for mechanical coal cutting, undoubtedly the best is that of Mr. F. M. Lechner, of Columbus, Ohio, as represented in the accompanying engraving. The machine is shown at rest.



The driving mechanism consists of two small engines, placed at the sides and back of the machine, operated by compressed air. By means of suitable gearing, the reciprocating motion thus obtained is converted to rotary motion, operating screws which drive forward the cutter-bar. The motion is also changed in direction so as to drive the chains which revolve the cutter-bar.

The essential features of this machine are the cutter bar and the modes of driving it; for whereas in most mining machines hitherto brought out, the cutter, or cutters, have been driven in a horizontal plane, the cutters in this case revolve in a vertical plane. The form of the axle is square, and to it are bolted the cutters, resembling in this respect very much the axles used in wood-cutting machinery. At two places upon the axle the narrow journals are formed, and are laid in suitable brass bearings in ends of the wrought-iron framing to which the driving machinery is fixed. Motion is communicated to the axle by a couple of pitch chains, which not only drive by the contact with the axle itself, but also by engaging a set of narrow cutters, which enter the open portions of the chain. In this manner only thin films of coal are left uncut where the chains work, and get broken off quite perceptibly by coming in contact with the links of the chain. By keeping the bearings of the cutter-bar as narrow as practicable, and arranging the cutters close to the framing, also the very little coal left uncut is carried away partially by the two driving chains already mentioned, and partially by another set of chains working at the two sides of the machine, as shown. In addition to the wrought-iron bars, which, as we have explained, form the framing to which the cutter-bar and the driving-gear are attached, another set of similar bars at the side of them form the stationary framing on which the whole machine slides. The forward motion is given by means of a stationary screw, round which a nut revolves, and this motion is arrested by moving a handle which separates the two halves of the nut in a similar way as the screw and nut are disconnected in most screw-cutting lathes. To bring the machine back again a bolt, attached to the stationary framing, is, by means of a handle, thrown into gear with one of the pitch chains, which are kept revolving to clear away the dust—although at a much slower pace than when the cutting takes place. Suitable means are provided for taking up the slack of the pitch chains when under wear takes place, but this is minimised by making them, as well as many other parts of the machine, of steel. Either steam or compressed air can be used for driving, but the means by which the motion is communicated from the pair of cylinders to the pitch chains and the feed-nut possess no special interest, and we need therefore, not describe them. The machine only weighs 750 lbs. complete, and can be handled by two men, so that it is unnecessary to lay down rails for it. It can either drive an entry, work in pockets, or on the long wall system.

The special advantages claimed for this machine are, that it requires no track, is easily and quickly handled by two men, drives all entrances, and turns rooms. It attacks the coal from the front, and is free from cross strain. The power is applied directly. One air-compressor is sufficient to drive four machines. It will be noted that the machine is compactly built, and that its principal moving parts, such as pistons, gearing, etc., are at a distance from the face, and are directly under the eye of the man running the machine. The Lechner machine is rapidly gaining in favor throughout the Western coal region and particularly in Ohio.

The full address of the Company is 98 North High St., Room No. 1 Sessions Block, Columbus, Ohio.

THE ELKINS MANUFACTURING & GAS COMPANY,

Gas Machines & Ajax Metal.

PHILADELPHIA.

It is often the case, that railroad companies find it advantageous to use some artificial light, other than gas, as supplied by a corporation for that purpose. With this view the Elkins Manufacturing and Gas Co. have perfected a gas machine. The gas made by this machine is equal to coal gas in all respects. They have just completed lighting the shops of the Northern Central Railroad at Baltimore, Md. Railroad men interested in the welfare and economy of their companies will do well to bear this in mind, especially the low price of making gas—$1.00 per 1000 cubic feet. This machine is no novelty, as the firm have been lighting the Katerskill Hotel, Catskill Mountains for one year with a fifteen hundred light machine. They have also a fifteen hundred light machine at the Mountain House, Cresson, Pa., which is owned and operated by the Pennsylvania R. R. One of the greatest features of this machine is the fact, that a plain gas burner without regulating screw of any kind is used, doing away with the annoyance of a screw, cross or regulating burner, which must be used with all other machines. The above firm are also exclusive manufacturers of the Ajax metal, a mechanical invention for overcoming friction to the bearings of revolving shaft axles. The Ajax metal is a composition, the base of which is Lake Superior copper, and consists of a chemical amalgamation of metals whereby the molecular forms are changed, making the composition at once exceedingly homogeneous and of a peculiarly oily nature, whilst the fibre of the metal is toughened to such an extent that in tensile strength it almost equals steel. The wearing qualities of the Ajax metal are superior to any thing ever before known as a journal bearing. Any railroad corporation, or manufacturing company desiring to give this metal a trial and not wishing to make any experiments can have the assurance of some of the best references which the firm have received from the largest R. R. companies, iron and steel mills, manufacturers, etc. The claim made for the Ajax metal is that it secures a greater mileage; does not wear the journal, which is a point frequently overlooked; and allows of no waste, as the metal can be re-run as often as desired. In pouring, they guarantee the loss not to exceed 1½ to 2 per cent. References have been received from the largest railroad companies, iron and steel mills of the country, as well as from leading manufacturers in Northern, Eastern, Western and Southern States. The advertisement of the company, elsewhere in our columns, states the names of a number of firms from whom full information can be had as to the merits of the Ajax metal.

CANTON SPRING COMPANY,

Manufacturers of Carriage, Wagon and Seat Springs.

CANTON, O.

The growing demand among builders and users of carriages and wagons for the best material and most perfect workmanship, renders it imperative that each part of the finished work shall be the best of its kind. Contributing as do the Canton Spring Company, Canton, Ohio, one of the most essential parts of the vehicle, and this with even better results than heretofore achieved, it is no matter of surprise that such appreciation should have been extended to them, as to have rendered it necessary for the Company to increase their facilities and appliances for the very highest class of work. Actual customers, or rather users, need nothing to be said commendatory of the productions of this Company, whilst their reputation suffices for those who may require carriage, wagon and seat springs. The excellence of the constructive design is aided by the excellence of the material which they employ and the good character of the workmanship. To this is added personal supervision over all the details of workmanship by the proprietors, Messrs. D. Cobaugh & H. L. Kuhn, who are both eminent mechanicians. There is also maintained a rigid inspection of the finished work. To these primary essentials are added the most searching tests. The high finish and uniformity of the goods are features of value to dealers and users. The company continues the manufacture of their celebrated Oil Temper Wagon Seat Springs, and are licensed manufacturers of all or nearly all the popular patent springs, including the Trinken, Brewster, Suroyer and others. They also make any special springs from pattern or diagram They have lately added to their stock of material, their own importation, a large quantity of the celebrated Graves Swedish steel, which enables them to execute with dispatch orders for high grade work.

Hartford Engineering Company, Hartford, Ct.

The Hartford Engineering Co., have issued a superb quarto illustrated circular of the Hartford Automatic Cut-Off Engine, which they manufacture exclusively under license from the Buckeye Engine Co. We notice in thi engine the extreme massiveness of the bed, a point of high importance in speed work. Its extreme rigidity is also added to by a massive hood over the cylinder. In all respects it is one of the most perfect engines of its kind in existence. It is possible to obtain as close regulation with it as the nature of the load and other conditions outside of the construction of the engine will permit with any known method of regulation. As to the range of adjustment we may state that when the earliest cut-off that the action of the regulator can produce is no earlier than is necessary to restrain the engine under its lighest load and greatest steam pressure, the latest will be at ⅝ to ¾ of the stroke, where it meets the fixed cut-off of the main valve, due to its lap and angular advance, this whole range of adjustment being under complete control of the governor. To appreciate the value of this feature it should be understood that with single essentric releasing gear movements, the governor can only control the time of release during the opening movement of the valve, which necessarily terminates before mid-stroke, so that if the release is not effected before mid-stroke, it will not take place at all during that stroke, thus causing extravagant expenditure of steam and spasmodic irregularities in the movement.

Chain for Transmission of Power.

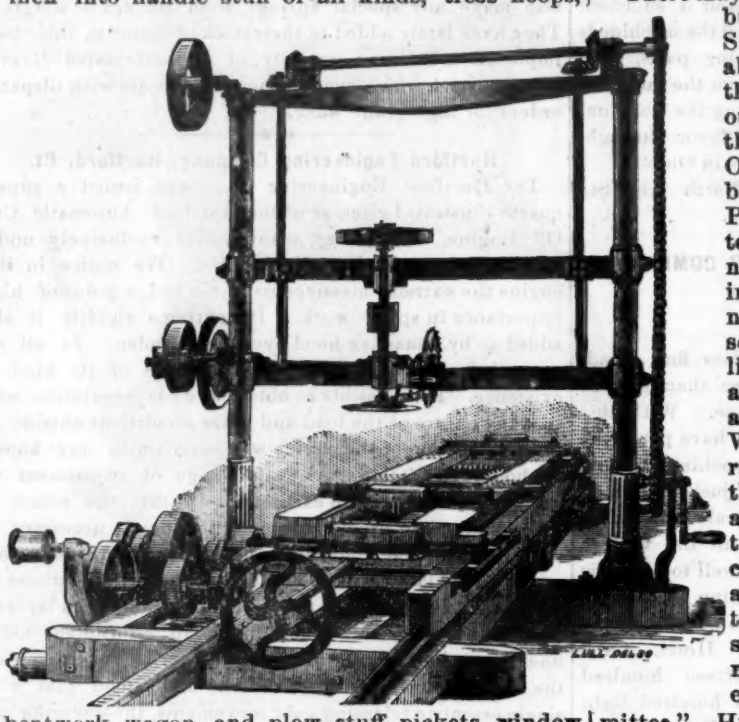
We would call attention to the Lechner Anti-Friction Roller Detachable Chain for transmitting power, which constitutes a most effectual and economical substitute for leather belting and cog gear wheels. It is positive in its motion, and no slipping is possible. Fully acquainted as we are with its merits we may state that it is especially adapted for running heavy shafting, for use on traction engines, agricultural machinery, elevators, drags, hoists, dredging machines, ditching machines, lifting cranes, roller trains in rolling and rail mills, elevating slack, nut and pea coal, saw dust and tan bark carriers. The great feature about this chain, and which makes it superior to all other chains for transmitting power, is the friction roller on the rivet, which causes it always to drop over the sprocket; takes all wear from the sprocket and ends of links, and does away with almost all friction. It can be run up to any desired speed, and will come the nearest transmitting all the power applied of any medium known. It is manufactured and sold by the Lechner Manufacturing Co., Columbus, Ohio.

We furnish an illustration of an excellent veneer or rotary cutting machine, exclusively manufactured by Mr. I. E. Merritt, Lockport, N. Y. The parts are wholly of iron and stees of best quality, are exceedingly massive, and full regard has been had to strength. Many veneer machines are excellent in design, but are not sufficiently substantial. This machine will take a log from 41 to 48 inches in length and 40 inches in diameter and slice it into veneer or thin lumber, any thickness from 1-20 up to ⅛ of an inch, varying by hundredth of an inch. They are usually made to cut about 8 or 10 different thicknesses, but the variety can be increased almost indefinitely at a slight additional cost. The pulley is 24 in. diameter, 6 in. face, and should run from 100 to 150 revolutions per minute, depending on the quantity of work wanted. Power required, about 4 to 6 horse. Weight of machine 4,000 lbs. Floor space 8x10 feet. Each machine is furnished with Scoring Knives to cut the stuff to length, or to mark it for bending for berry boxes, grape baskets, etc. A roller is also put on with knives on the surface for cutting stuff to work and shape when desired.

AUTOMATIC SAWING AND VENEER CUTTING MACHINES.

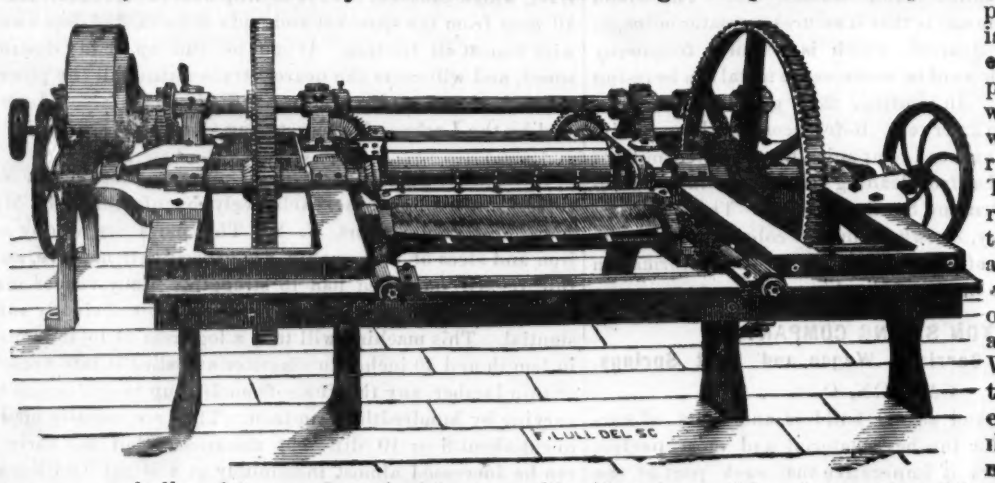
I. E. Merritt,
LOCKPORT, N. Y.

We illustrate an automatic sawing machine improved and made by Mr. I. E. Merritt, Lockport, N. Y., which is of very great merit, and has a wide range of adaptedness, being used for sawing small stuff of all kinds from the log, and admitting of quite as advantageous application to small as large logs. It is evidently cheaper to saw the stuff in the first instance from the log for manufacturing purposes. Again, the thinness of these saws saves an appreciable amount of timber. They can be run by an unskilled man. It will saw a log as large as three feet in diameter and as small as three or four inch into handle stuff of all kinds, tress hoops,



bentwork, wagon and plow stuff, pickets, window slats, chair rounds, trunk slats, barrel hoops, lath, etc., at the rate of ten to fifteen per minute, and faster than the same can be slit or sawed from plank or boards, and saves the handling necessary for the latter operation. The small machine will cut any length up to seven feet and two and one-half inches in thickness, and can be made to cut longer and larger, though in hard-woods, if greater size is desired, it would be best to purchase the large machine, as it will cut stuff as small as the other. The large machine will saw from the log eight feet long, or as short as may be desired, and four inches square. Means are provided for adjusting the saws as they wear away by use. In addition to the automatic action, which carries the log forward and back, it is carried transversely against the proper gauge by a transverse setting arrangement, and has various useful attachments fully described in the circular of the manufacturer.

The accompanying cut shows the construction of an excellent veneer or rotary cutting machine, exclusively manufactured by Mr. Merritt. The



parts are wholly of iron and steel of best quality, are exceedingly massive, and full regard has been had to strength. Many veneer machines are excellent in design, but are not sufficiently substantial. This machine will take a log from 30 to 48 inches in length and 40 inches in diameter and slice it into veneer or thin lumber, any thickness from 1-20 up to $\frac{3}{8}$ of an inch, varying by hundredth of an inch. They are usually made to cut about 8 or 10 different thicknesses, but the variety can be increased almost indefinitely at a slight additional cost. The pulley is 24 in. diameter, 6 in. face, and should run from 100 to 150 revolutions per minute, depending on the quantity of work wanted. Power required, about 4 to 6 horse. Weight of machine 4,000 lbs. Floor space 8x10 feet. Each machine is furnished with scoring knives to cut the stuff to length, or to mark it for bending for berry boxes, grape baskets, etc. A roller is also put on with knives on the surface for cutting stuff to width and shape when desired.

THE DELUSION.

Claudius Jones & Co.,
ERIE, PA.

There may be a pleasure in witnessing a delusion, but there is none in being caught by one. Such is the experience of those detestable vermin—mice who are caught in the "Delusion" mouse trap illustrated in our advertising columns, the latest thing in the line, and by far the best. Our cut exhibits it as a sort of small bastile. Claudius Jones & Co., of Erie, Pa., its devisers, and who manufacture tens of thousands per annum, must have no little humor in their composition, for in writing of it they observe: "It does not catch a mouse around the neck and squeeze the immortal soul out of him, like the old kind, but gets him in side in a cordial, friendly manner, and sets out a free lunch counter for the victim. When the other mice hear him inside rattling the plates and smacking his lips they all go in. It will hold enough for a quorum, and after the caucus has transacted all the business that is to come before the meeting, a motion to adjourn is in order; but when they come to adjourn it is found impossible to do so with any degree of success. It is more fatal than yellow fever, and as efficient as a Leadville vigilant committee." Hardware stores throughout the country are ordering this attractive trap,

For David L. and Claudius Jones
Have got a trap that breaks no bones;
The mouse goes in to get the bait
And shuts the door by his own weight.

The firm have been in business five years. Large consignments are regularly dispatched to England, Ireland, Scotland, France, Germany, India, Australia, China and Africa.

WIRE CLOTH AND WIRE GOODS.

Toledo Wire Works.
TOLEDO, O.

The multiform uses to which wire is now applied has created a vast industry, to which there is no assignable limit. A large amount of inventive skill is necessarily embodied in the machinery appliances for the treatment of wire, and later improvements, more especially those which concern the production of wire cloth and wire goods, have brought the processes adopted up to comparative perfection. There is no design, however intricate, for purposes to which wire is applicable, which cannot be readily woven. The weaving operations pertaining to textile goods are repeated in wire, and marvelous combinations are brought about. Were we called on to point to any establishment to illustrate the ingenuity brought to bear on this interesting branch of manufacture, we should refer to the Toledo Wire Works, which we have had the pleasure of inspecting, and of which Messrs. F. Powell & Co., the eminent machinists, are the proprietors. The works, which are situated 238 Summit street, corner of Oak, Toledo, were established two years since. At these works prominent designs of all kinds of wire goods are carried out, a leading specialty being window screens. The brass and iron wire cloth will attract the attention of the visitor for its geometrical regularity and fineness the meshes being regulated according to the purposes to which the cloth is applied. Most effective bank and counter railings are turned out, of a strength that would be unsuspected by those who have not tested them. As the material lends itself to any patterns, the opportunity is afforded of bringing these into unison with the architecture of interiors or style of furnishing. In our tour through the works we had occasion to admire the inventive suggestiveness and artistic taste displayed in settees, chairs, bird cages, wire and flower stands, vases, &c. We notice that the wire window and door screens are made with slides, so as to raise and lower without difficulty, an advantage that will be readily appreciated. The facilities of manufacture have been increased to such an extent that large as are the orders on hand, the firm can undertake to execute them promptly. The scale of its operations enables it to supply its wire cloth and goods at the lowest prices compatible with the best material and workmanship.

The wire signs of the firm are one of its leading specialties. There is a large demand from all parts of the country for its productions in this line. We append a view of a light wire banner to be suspended in front of stores, and which is made 3x4 feet high to 4½x6. Their Ornamental Wire Signs are the ne plus ultra of elegance in design

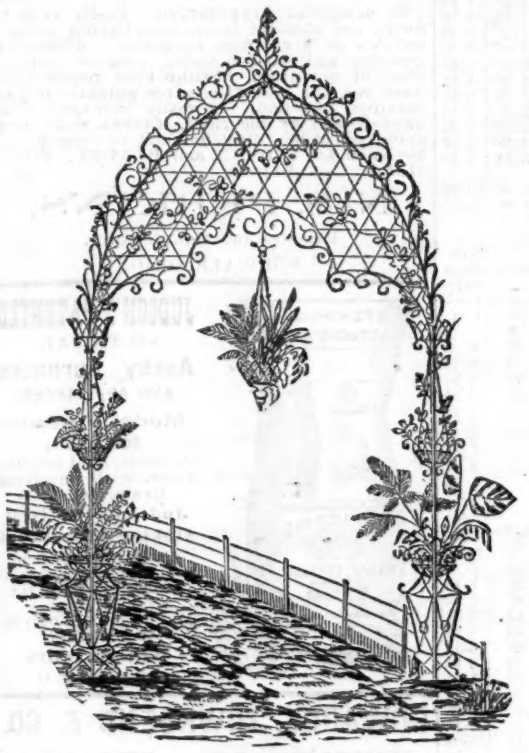
and effective display, designed to be suspended in front of stores, and appropriate to hang out from the first story over a walk. The frame is made entirely of metal, painted a rich, bright color, and relieved with gold, making a very handsome sign. In this banner the letters are gilded with pure gold leaf upon a metal surface, placed upon both sides of the banner, so that it reads alike on either side. The secret of success is to excite attention, and this description of ornamental sign assuredly secures this. Other signs of open wire work are also provided, to be boldly projected, and the lettering of which, if limited to a few words, can be read at a great distance. Wire rope is furnished by which they may be suspended across a street.

We must notice the company's wire frames, which fasten securely to the window frame with screws. Among the most pleasing is the heavy crimped diamond guard. The extra heavy guards are suitable for prisons and asylums.

The capabilities of wire for ornament will excite surprise when the improved flower stands of the firm come to be inspected. There is a lightsomeness in these which befits the material, whilst skill is shown in combining with this quality the utmost attainable strength. The improved flower stands are most attractive in form, the general design of which is a tasteful arch, shelf and baskets. One of these which, with stand and arch, is six feet, and without arch three and a-half feet, will hold no less than thirty pots. These stands, filled with pots, and vines climbing over the arch, constitute one of the most attractive parlor ornaments attainable. Their handsome appearance is increased by enameled paint and bronze. Until these works led the way, flower stands were of an old conventional style, suggestive of Eastern unchangeability Flowers and leaves are set to full advantage by these stands, and the plants have

plenty of light and sun. Every detail has been attended to, even to protecting the carpet from water. The firm's stands, which are intended for conservatories, merit special attention for their capacity and lightness. There are other stands occupying very little space, designed for small rooms, alcoves, &c. One novelty is a stand mounted on an ornamental iron pedestal, with porcelain castors, possessing high revolving shelves, which facilitate watering, and allow of every part of a plant receiving its due proportion of sunlight. It is to lovers of flowers, to those who delight in artistic homes, that these stands recommend themselves. We must not omit from notice stands used for displaying goods in shop-windows. They are painted white, and the shelves being trimmed with a crimped brass plate, they present a very handsome appearance. Supplemental to these are suspended baskets of a most aerial appearance.

We append an illustration which affords a ready conception of the capabilities of the Toledo Wire Works in the way of ornamentation in an



arch suitable for any garden avenue to which climbing plants may attach themselves, forming an attractive feature even in the most circumscribed grounds.

Heavy wire arm-chairs are produced at these works, suitable for verandah and garden use, and which are far more attractive, and also more durable than those made of wood. The fences for cemetery lots are so durable and handsome that independently of their greater cheapness, they are to be preferred to cast iron or wood. We have referred to the railings for offices, which are being largely shipped to the East and West for banking institutions, insurance companies, brokers and merchants,—railings that, besides their beautiful appearance, afford unobstructed circulation of air and light, and in the case of tellers and cashiers are a protection against sudden attacks. Really ornamental wire fences are made for fronts of residences, which heighten the general effect of the grounds. The crimped wire stall guard has a heavy wrought iron frame, into which the wire is worked, rendering it as lasting and strong as could be desired. The stall partitions for livery and railroad stables are exceedingly solid, and admit, through their frames, of being screwed to the wood work. The crimped window guards are made in a great number of sizes of diamond mesh, and effectually prevent breakage of windows from stones; nor do they appreciably obstruct the light or mar the appearance of the buildings. Among other articles produced at the works are umbrella and cane stands, tined spark guards, garden trellises, riddles and sand screens, flour and meal sieves, dish covers, grid-irons, vegetable boilers, &c. The brass and iron wire cloth produced for various purposes cannot be too highly spoken of. Some of these are in figured patterns. Wire show stands are produced in great variety; also cages. There is a great run on the galvanized wire netting and fencing for all sorts of enclosures and for the construction of arbors. This fencing is made of any mesh or width to order; will last a quarter of a century, and may be readily shipped or removed. The chief shipments of the firm are to Ohio, Michigan, Indiana and Illinois.

LEATHER BELTING AND INDIA RUBBER GOODS.

C. T. Bodifield & Co.,
CLEVELAND, O.

The firm of C. T. Bodifield & Co., who are agents for P. Jewell & Son's leather belting, and also jobbers in India rubber goods adapted to mechanical purposes, have established themselves in the Perkins' Power Block, 70 Frankfort street, Cleveland, convenient at once for its spacious accommodation and central position. Jewell's belting has secured a well deserved reputation for its durable qualities. The "Extra" leather belting, which is particularly in demand, and made specially for Messrs. Bodifield & Co., under contract, is the very heaviest and best leather that comes from Jewell & Co.'s tanneries. It is made from pure oak tanned butts, is strictly short lap and extra heavy. The term "Extra" is conveniently chosen to distinguish it from "Standard" and also cheap goods in general. The firm, knowing its merits, warrant it fully, and users confirm their judgment as to its being better stretched and better selected than any other belt made. One secret of its excellence is that it is made from the heaviest and choicest leather that can be obtained. We may here mention that the capacity of the firm of Jewell & Co., of Hartford, for belt production is unrivalled. They have just produced for a New York flouring mill the largest belt ever made from one width of hide. It is forty-eight inches wide, ninety-six feet long and weighs one thousand pounds. The Jewells are now making two still larger belts than the above for one of the largest rubber factories in the country. One is forty-eight inches wide and 120 feet long, the other is forty-four inches wide and 150 feet long, both double thickness. These are the largest belts that can be made from a single hide, as no hide can be solid and thick more than four feet in width. It is but a few years since belts of these proportions could be made, or pulleys on which to run them, and in no country but this is it done now.

The "Standard" leather belting dealt in by Messrs. Bodifield & Co., is made from carefully selected leather; the laps are medium, not long, and it has the requisite qualities to afford satisfaction.

The large business carried on by Messrs. Bodifield & Co. in rubber goods is on a system which must commend itself to all users. The great difficulty with customers is securing precise qualities, weight and size desired, and such is the variety of prices and qualities that great delay is constantly entailed in securing the right thing. To remedy this state of things the firm have made a contract with one of the largest rubber manufacturers to make them a special belt, warranted full weight, &c., to which they can directly refer customers, and enables them to fill all orders promptly. They consider that they have the best rubber belt ever offered in this market, and have no hesitation in giving it as strong a guarantee as any of the rubber manufacturers furnish. Their packing hose and other rubber articles for mechanical purpose is of exceptionally good quality.

We would call attention to the merits of the firm's metallic-tipped belt lacings. The discussion amongst mechanical men is almost endless as to the best methods to join the ends of a belt when put on pulleys, but in the opinion of prominent manufacturers who have adopted the lacings of Messrs. Bodifield & Co., these have proved in their estimation the best mode of fastening. The lacings are cut from the best selected stock. All know the annoyances derived from fastenings yielding, compelling a stoppage of machinery. To avoid even such an occasional result, the firm test and stretch separately every string, thus insuring absolute perfection.

NEW UNIVERSAL MILLING MACHINE.

C. E. Lipe,
SYRACUSE, N. Y.

A new universal milling machine has been introduced by Mr. C. E. Lipe, Syracuse, N. Y., the excellence of which, owing to its ready and quick adjustment for special operations, and the advantage that the moving parts may be set at any point within the limit of range without special preparation or change of parts, has secured its commendation from our leading Western manufacturers. The mechanical combinations introduced allow of the utmost possible scope in its application, whilst it has the merit of taking the very heaviest cuts. To come to details, we may remark that the column is cast hollow with shelves for tools, and is provided with a door which is on the opposite side from that shown in cut. The transverse adjustment of the cutters to the work is effected by mounting the spindle and cutter arbor, cone shaft, outside center arm and the adjustable part of the feed mechanism, on a traveling head gibbed to slide on top of the column and connected by a rack and pinion movement, which is controlled and the head located by an adjustable lever and measuring dial. Distances are ordinarily read by a friction-clamped pointer, adjustable to zero, moving over the dial. A venier arm reading to thousandths of an inch is also provided for very accurate adjustment.

The cone shaft is at right angles to the spindle, which is driven by a hardened steel worm and bronze gear enclosed in head, which is cast hollow with two bridges across from side to side. These bridges with the shell, support the solid boxes for spindle, and form oil compartments, holding a quart or more of oil each. They are filled from a pouch on the outside. The worm gear is thus made to revolve continually in oil, ensuring perfect lubrication; each bearing is also provided with means for self-oiling, in addition to the usual oil holes. The spindle is threaded on front end, and has a hole 1 9-16 inches in diameter through it, tapering in front for arbor. By the arrangements the table can be set to move at any angle with the spindles and quickly clamped, and as this ring is of large diameter (the outside diameter of box being 17 inches) and bears evenly round the entire circle, the cap is held as rigidly as if it were solid with the knee. The automatic feed of the table is accomplished by means of a leather-covered friction disc, which drives a vertical shaft carried by a bracket hinged to the head. The pressure between the pulley and disc is regulated by an adjustable spring tension, and the feed can be set at any point. By turning the table a complete half revolution work may be done on both sides of a piece without resetting, thus ensuring perfect parallelism.

The index head, in design, is an entirely original conception. It is a hollow box, the outline of which is about two-thirds of a circle. The opening, in front or chord side, is surrounded by a heavy flange, and bored out as large as permissible. This forms the front-bearing of the spindle and face plate, which is cast in one piece. A rear and smaller bearing is provided on the circular part of the case. The spindle also carries an accurately divided steel gear of sixty teeth. An adjustable center rest of novel design accompanies the outfit.

A complete automatical spiral cutting outfit is also furnished when desired, which will evolve spirals of any conceivable pitch greater than one turn in four inches, the limit of length being about 10". A heavy vise with steel faced jaws 7½" long by 1¾" deep opening to 4½", is also furnished. The machine is driven by a 3" belt and has 4 changes of speed. It is powerfully back-geared in the worm and worm gear. The weight of machine and attachments is about 2,800 pounds. The countershaft, making 275 revolutions per minute, is driven with a 4½ belt, and being placed directly over the central position of cone shaft no trouble is experienced by the short movement of the cone and head.

THE Texas Pacific Railroad will establish experimental farms along its line next season. The purpose of these farms will be to test the availability of lands for different farming purposes.

THE Western Union Telegraph Company has now in operation almost 350,000 miles of wire and sent nearly 30,000,000 messages last year, the earnings not being much short of $6,000,000.

DR. SIEMENS calculates that the present annual yield of all the coal mines of the earth would suffice to keep up the fire of the sun at its present intensity of light and heat for about the forty millionth part of a second.

DURING last week all the speculations in the products of the soil suffered further sharp and decisive reversals. Cotton was weak and lower on better accounts of the growing crop, now estimated at near 6,000,000 bales, and prospects of only a moderate demand from abroad.

TRAVELERS' REGISTER.

Lake Shore & Michigan Southern.

Trains marked with a * are the only trains that arrive and depart in this city on Sundays.

ARRIVALS.	a.m.	a.m.	p.m.	p.m.
Through from East	*2 50	*6 35	1 25	*1 40
Through from East	....	....	....	*7 05
N. Y. & Chicago Ex	....	12 23	....	....
Conneaut Accommoda'n	8 40	....	....	....
Nottingham Accom'd'n	†10 05	....	†4 45	....
Elyria Accommodation	8 50	....	....	....
From West via Sandusky	*7 05	11 00	....	10 12
Fast Express	*1 35	....	....	....
From West via Norwalk	....	11 00	2 25	10 10
Pt. Clinton Accom'dat'n	....	11 00	....	....

DEPARTURES.	a.m.	a.m.	p.m.	p.m.
Through Eastern Train	*7 30	11 15	*2 55	10 35
Fast N. Y. Express	*1 50	....	....	....
Conneaut Accommod'n	....	....	4 50	....
Nottingham Accom'd'n	†9 00	....	12 15	....
Elyria Accommodation	....	....	5 00	....
West via Norwalk	6 40	....	3 30	*7 35
West via Sandusky	8 05	7 00	*2 05	5 00
N. Y. & Chicago Ex	....	12 33	....	.
Pt. Clinton Accom'dat'n	....	....	5 00	....

Cleveland, Columbus, Cincinnati & Indianapolis.

ARRIVALS.

No. 2 Col. & Cin. & Ind'pous Ex	*7 10 A.M
No. 8 C. T.V. & W. & Clev. Accom	10 30
No. 12 St. Louis & New York Exp	*3 00 P.M
No 6 Indianapolis & Columbus Exp	10 20
No. 10 Wheeling & Cleveland Exp	7 15
No. 4 Special Cin. & New York Exp	*3 40

DEPARTURES.

No. 1 Cincinnati & Columbus Exp	8 00 A.M
No. 11 Cleve, Indianap. & Wheel'g Ex	7 10
No. 3 Special St. Louis & Cincinnati Ex	1 55 P.M
No. 5 Night Express	*7 25
No. 7 C.T.V. & W. & Col. Accom	4 00

†This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

Cleveland, Tuscarawas Valley & Wheeling.

ARRIVALS.

Wheeling & Cleveland Express	8 25 P.M
Uhrichsville Express	10 30 A.M

DEPARTURES.

Wheeling & Cleveland Express	7 15 A.M
Uhrichsville Express	4 00 P.M

New York, Pennsylvania & Ohio.

ARRIVALS.

No. 7 Mahoning Valley Accommo	10 55 A.M
No. 3 New York Express	*7 00 P.M
No. 1 New York Express	6 50 A.M
No. 9 Pittsburgh Express	*7 00 P.M
No. 5 Pittsburgh Express	2 00
New York Express	2 00
No. 9 Youngstown and Pitts. Local	10 15

DEPARTURES.

No. 12 New York Express	*7 10 A.M
No. 4 Youngstown Local	11 00
No. 8 Mahoning Accommodation	4 25 P.M
No. 2 New York Express	10 45
No. 12 Pittsburgh Express	*7 10 A.M
No. 6 Pittsburgh & Main Line Express	2 30 P.M

Cleveland & Pittsburgh.

	ARRIVE.	DEPART
Pittsburg & Wheeling	1 45 P.M	8 50 A.M
Express	6 55	2 30 P.M
Alliance Accommodation	10 15 A.M	3 45
Ravenna Accommodation	8 35	5 35
Night Express	6 30 A.M	†11 40 P.M

† Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

Valley Railway.

ARRIVE.		DEPARTURES.	
No. 2 Accom	10 15 A.M	No. 1 Mail	8 15 A.M
No. 6 Express	1 35 P.M	No. 3 Accom	2 30 P.M
No. 4 Mail	6 30 P.M	No. 5 Exp	6 05

Special trains leave on Sunday at 8.30 A. M. and 4.20 P. M., arriving at Cleveland at 10 A. M. and 6.25 P. M.

Trains leave from Depot foot of South Water Street.

Connotton Valley Railway.

Arrive.		Depart.	
No. 1	10 05 A.M	No. 4	10 05 A.M
No. 3	4 00 P.M	No. 2	4 40 P.M

All trains arrive and leave depot corner Commercial and Fifth Streets

Cleveland, Akron & Columbus Railroad.

Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Railroad to Hudson, for Akron, Columbus, etc.

	ARRIVE.	DEPART.
Mail	1 15 P.M	8 00 A.M
Express	7 25	1 50 P.M
Accommodation	10 10 A.M	3 45 P.M

CLEVELAND & PITTSBURGH

RAILROAD.

Trains leave Cleveland and arrive at the points named below as follows: Night Express runs daily, all other trains daily except Sundays.

	Mail.	Fast Line.	Accom.	Night Expr'ss.
Leave Cleveland	8 50 am	2 30 pm	3 45 pm	11 40 pm
Arrive Hudson	10 00	3 28	4 50	12 50 am
Ravenna	10 40	3 58	5 50	1 18
Alliance	11 25	4 25	6 05 pm	2 05
N. Philadel	11 35 pm	7 15	.....	10 55
Salem	12 25	.....	.....	3 02
Canton	12 28	5 47	.....	3 20
Massillon via Alliance	12 50	6 06	.....	3 38
Akron	10 42 am	4 10	5 40 pm	.....
Pittsburgh	3 30 pm	7 45	.....	6 55
Wheeling	5 10	8 00	.....	8 55
Marietta	8 45	.....	.....	.....
Harrisburg	.....	4 15 am	.....	4 00 pm
Philadelphia	.....	7 50	.....	7 35
New York	.....	11 15	.....	10 35
Baltimore	.....	7 55	.....	7 20
Washington	.....	9 17	.....	8 47
Boston	.....	8 00 pm	.....	.....

Ravenna Accommodation leaves Cleveland at 5:30 p m, reaching Ravenna at 7:15 p m; Akron 7:23 p m.

Newburgh Accommodations leave Cleveland at 11:00 a m and 12:30 pm. Returning, leave Newburgh at 11:10 am and 1:30 pm.

Passengers for New York, Philadelphia, Baltimore, Washington, and all points east of Pittsburgh make but one chang of cars, viz. at Union Depot, Pittsburgh, excepting those leaving on the Fast Line which has Pullman Sleepers from Cleveland to Philadelphia and New York.

The Fast Line leaving at 2;30 P. M. has elegant Pullman Palace Sleeping Cars through from Cleveland to New York without change. Pittsburgh Passengers who desire Parlor Car accommodations can secure seats in this car.

The Night Express has Pullman Sleeping Cars from Cleveland to Pittsburgh which can be occupied by passengers at Union Depot, Cleveland, any time after 9:00 P. M. At Pittsburgh passengers can take elegant through Parlor or Sleeping Cars for the East.

Sleeping and Parlor Car accommodations from Cleveland and Pittsburgh eastward can be secured at the Union Sleeping and Parlor Car Office Union Passenger Depot; of H. C. Marshall, Union Ticket Office, Weddell House; or of the Ticket Agent at the Euclid Avenue Station.

Through tickets can also be secured at the same points. Baggage checked through from the Union Depot or from Euclid Avenue Station.

By the 8:50 A. M. train a through car leaves daily for Akron, Gambier, Mt. Vernon, Columbus and immediate points, without change.

The 2:30 P. M. train has through car for Akron, Orrville, Columbus and immediate points, arriving in Columbus at 9:25 P. M.

By the 3:45 P. M. Accommodation train cars run through without change from Cleveland to Cuyahoga Falls, Akron and Millersburgh.

Night Express leaving Cleveland at 11:40 P. M., runs daily, and makes connection at Wellsville for Steubenville, Bridgeport, Wheeling, Bellaire and intermediate points. Every night in the week except Saturday the night express runs via Wellsville. On Saturday nights it runs via Alliance. All other trains run daily except Sunday.

Trains arrive at Cleveland.—Night Express at 6:30 P. M., having Pullman Sleeper from Pittsburgh; Ravenna Accommodation, 8:35 A. M., Alliance Accommodation, 10:15 A. M.; New York Wheeling & Washington Mail, with Pullman Sleeping Car from New York and Philadelphia, 1:45 P. M.; New York, Philadelphia & Wheeling Express, 6:55 P. M.

WM. A. BALDWIN, General Manager. **E. A. FORD,** Gen'l Pass. & Tkt. Agt. Pittsburgh, Pa.

C. L. KIMBALL, District Passenger Agent, corner Bank and St. Clair streets, Cleveland.

Cleveland to New York,

VIA THE

NEW YORK, PENNSYLVANIA AND OHIO RAILROAD.

Formerly Atlantic & Great Western Railroad.]

For New York, Boston and the East. The shortest and quickest route to Pittsburgh, Washington, Baltimore and the Southeast

Until further notice trains will leave the new Central Depot, South Water Street and Viaduct, as follows:

7:10A.M. LIGHTNING EXPRESS, (daily,) sleeping and hotel coaches from Leavittsburg. 8:55 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p.m.; Buffalo, 6:15 p.m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p.m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

10:45 P.M. NIGHT EXPRESS, (daily ex cept Sunday), Sleeping Coach from Leavittsburg to New York without change. Arrives at Youngstown 1:45 a.m; Meadville, 3:50 a.m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a.m.; Rochester, 1:10 p.m.; Hornellsville, 11:20 a.m.; Corning, 12:53 p.m.; Elmira, 1:21 p.m.; Binghampton, 2:50 p.m.; New York, 9:25 p.m.

2:30 P.M. PITTSBURGH EXPRESS,—daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m.; Washington, 7:30 a.m.; Baltimore, 8:15 a.m; via Sharon and Sharpsville to Meadville 7:40 p.m; Corry, 9:10 p. m.; Lakewood, 9:50 p.m.; Jamestown, 10:00 p. m.; Salamanca, 11:10 p. m.

4:25 P.M. MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p.m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p. m.

7:10 A.M. PITTSBURGH EXPRESS,—(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a.m., and 1:13 p.m. and 4:20 p.m.

11:00 A.M. YOUNGSTOWN & PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:50 a.m., 10:55 a.m. 2:00, p.m. 7:00 p.m., and 10:15 p.m.

☞ This is the only route by which passengers can reach Corry, Elmira, Binghampton, New York City, and intermediate points WITHOUT CHANGE. No change to Boston and New England cities.

Baggage Checked Through to All Points East

☞ Through Tickets and information regarding the route can be obtained at the Union Ticket Office, corner Bank and Superior streets; at office 131 Bank street, and at new Depot of New York, Pennsylvania and Ohio Railway, South Water street and Viaduct, Cleveland.

A. E. CLARK,
Gen. Pass'r. Agt., Cleveland, Ohio.

P. D. COOPER, Gen. Man'gr, Cleveland.

M. L. FOUTS, Pass. Agt., 131 Bank st., Cleveland.

NOTICE.—Hereafter all Passes must be returned to the General Passenger Agent within FIVE DAYS after date of expiration; otherwise they will be discontinued.

Blue Grass Route of Ohio

TIME TABLE.

The Cleveland, Mt. Vernon and Delaware RAILROAD.

GEO. D. WALKER, RECEIVER.

SOUTH-BOUND TRAINS.

STATIONS.	Accom	Accom	Expr	Mail	Sundays only
Leave.	P. M.	P. M.	P. M.	A.M.	P.M.
Cleveland	5.30	3.45	2.30	8.50	....
Hudson	6 53	5.02	3.35	10.10	4 30
Cuyahoga Falls	7.11	5.30	8.53	10.29	4 40
Akron	7.23	5.46	4.10	10.42	5 00
*North Portage	P.M.	6.00	4 24	10.54*	6 14
Clinton	.....	6 19	4.44	11.09	5 31
Warwick	.....	6.29	4.49	11.14	5 37
*Marshallville	.....	6.43	5.02	11.27*	5 50
Orrville	.....	6 58	5.14	11.42	6 02
*Apple Creek	.....	7.17	5 32	11.58*	6 22
Fredricksburg	.....	7.32	5.45	12.11	6 37
*Holmesville	Accom	7.43	5 55	12.21*	6 48
Millersburg	.....	7 55	6.08	12.34	7 00
	A. M.	P.M.			A.M.
Millersburg	5.50	.....	6.08	12 34	7 00
*Killbuck	6.02	.....	6.20	12.47*	7 12
*Black Creek	6.13	.....	6.31	12.59*	7 25
Gann	6.33 b 6.53	.....	6.51 b 7.11	1.19	7 47
Danville	7.04	.....	7.20	1.29	7 59
Howard	7.18	.....	7.29	1.38	8 10
Gambier	7.22	.....	7.38	1.47	8 20
Mt. Vernon	7.35	.....	7.51	2.00	8 33
*Bangs	7.45	.....	8.01	2.11*	8 45
*Mt. Liberty	7.53	.....	8.09	2.20*	8 54
Centerburg	8.05	.....	8.18	2.30	9 05
*Condit	8.19	.....	8.32	2.44*	9 19
*Sunbury	8.27	.....	8.40	2.53*	9 28
*Galena	8.32	.....	8.45	2.58*	9 34
Westerville	8.48	.....	9.00	3.15	9 50
Arrive at Columbus	9.15	....	9.25	3.40	10 20
	A.M		P.M.	P.M.	A.M.

NORTH-BOUND TRAINS.

STATIONS.	Expr	Mail	Accom	Accom	Sundays only
Arrive at	P. M	P. M.	A. M.	A. M.	A.M.
Cleveland	1 45	6.55	10.15	8.30	.....
Hudson	12.35	5.48	8.53	7.15	10.30
Cuyahoga Falls	12.16	5.30	8.33	6.58	10.11
Akron	12.03	5.17	8.20	6.45	9.59
*North Portage	11.46	5.00*	8.03	A. M.	9.34
Clinton	11.30	4.44	7.46	.....	9.18
Warwick	11.25	4 37	7.37	.....	9.12
*Marshallville	11.10	4.27*	7.23	.....	9.00
Orrville	10.57	4.14	7.10 b 6.40	.....	8.47
*Apple Creek	10.40	3.56*	6.22	.....	8.27
Fredricksburg	10.26	3.43	6.08	.....	8.13
*Holmesville	10.16	3.33*	5.58	Accom	8.02
Millersburg	10.05	3.22	5.45		7.50
			A. M.	P. M.	P.M.
Millersburg	10 05	3.22	.....	8.35	7.25
*Killbuck	9 51	3.08*	.....	8.23	7.13
*Black Creek	9.39	2.57*	.....	8.11	7.00
Gann	9.17	2.36	.....	7.49	6 38
Danville	9.07	2.27	.....	7.39	6.25
Howard	8.58	2.18	.....	7.29	6.14
Gambier	8.49	2.09	.....	7.14	6 08
Mt. Vernon	8.37	1.57	.....	7.02	5.54
*Bangs	8.22	1.40*	.....	6.46*	5.37
*Mt. Liberty	8.14	1.31*	.....	6.37	5.28
Centerburg	8.05	1.22	.....	6.28	5.17
*Condit	7.51	1.09*	.....	6.14	5.03
*Sunbury	7.42	1.01*	.....	6.06	4.53
*Galena	7.37	12 56*	.....	6.00	4 47
Westerville	7.20	12 40	.....	5.43	4 30
Leave Columbus	6.55	12.15	.....	5.15	4.00
	A. M.	P M		P. M.	P.M.

* Stop on signal. B Breakfast. S Supper.

Special Round trip rates will be made for Sunday trains.

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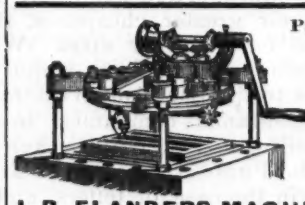

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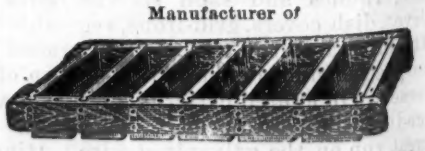

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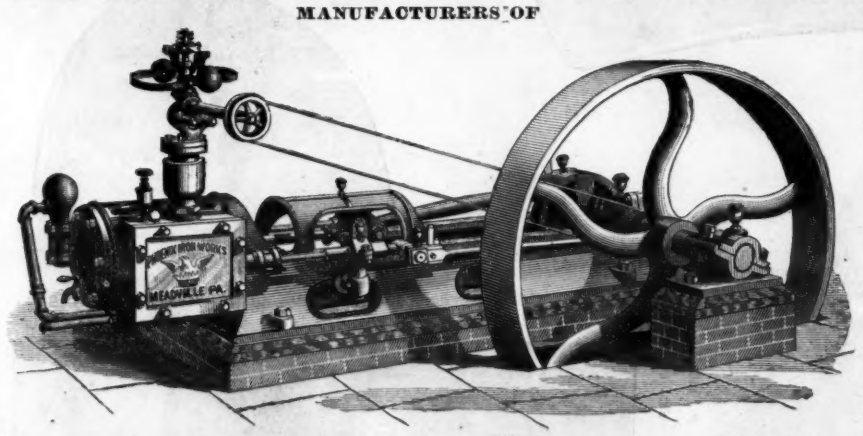

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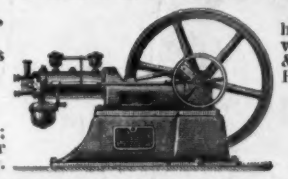

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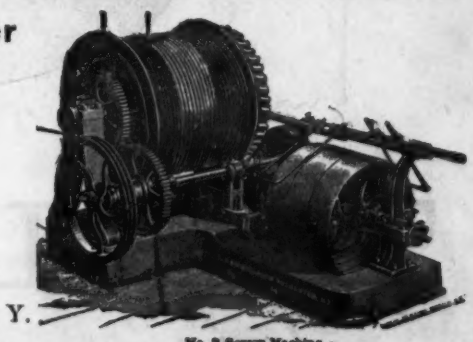

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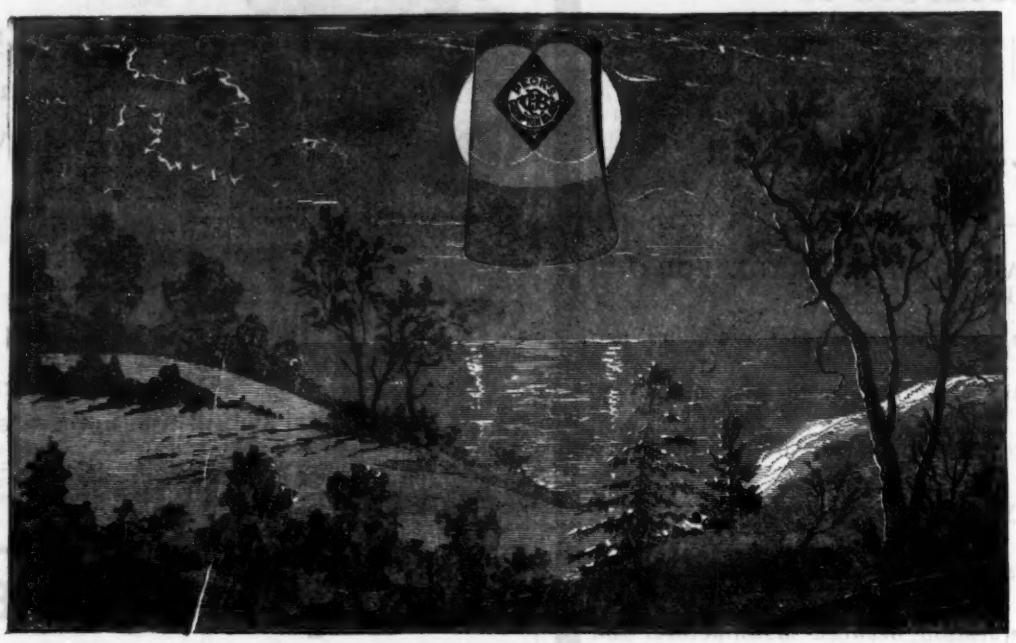

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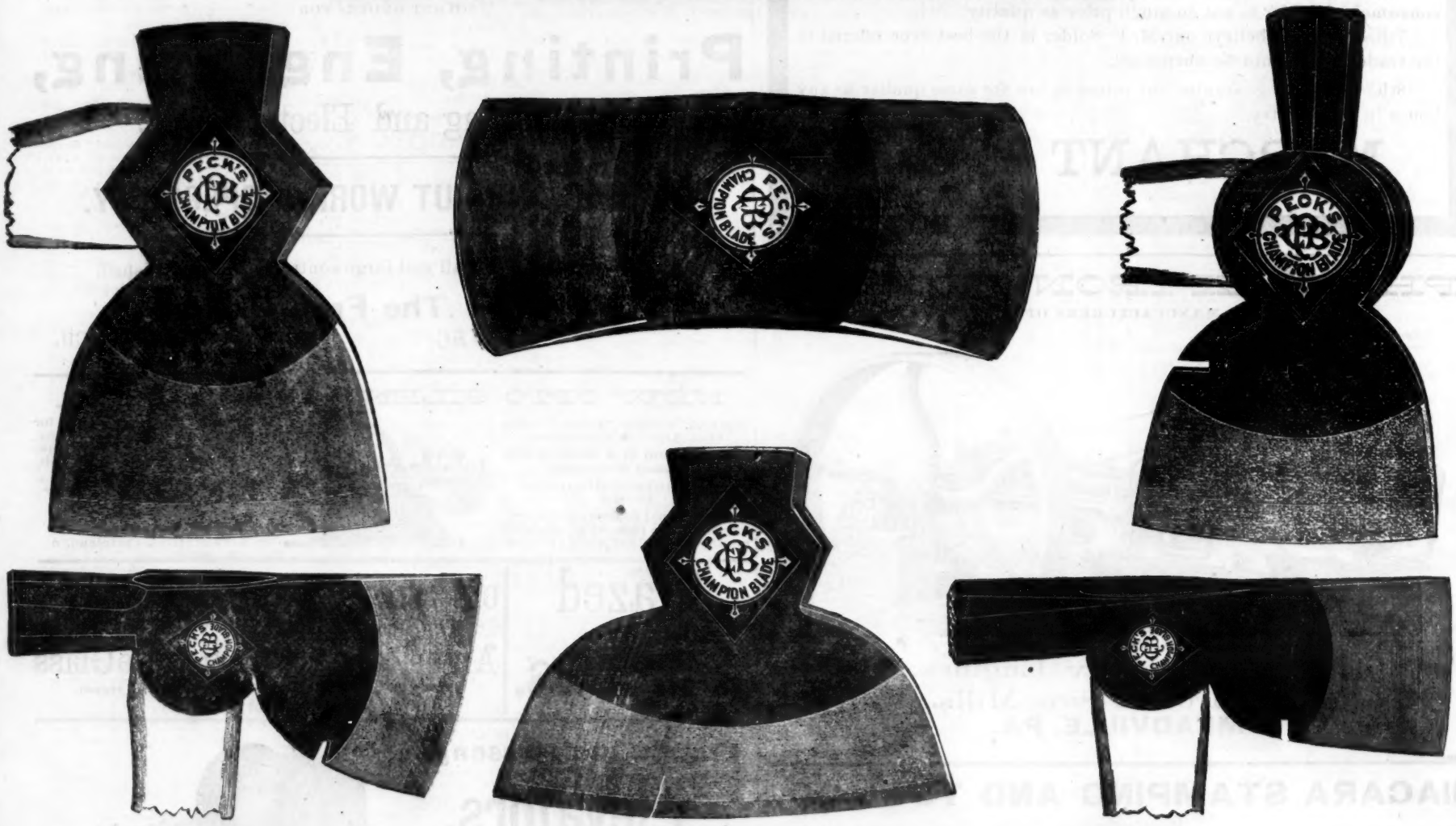

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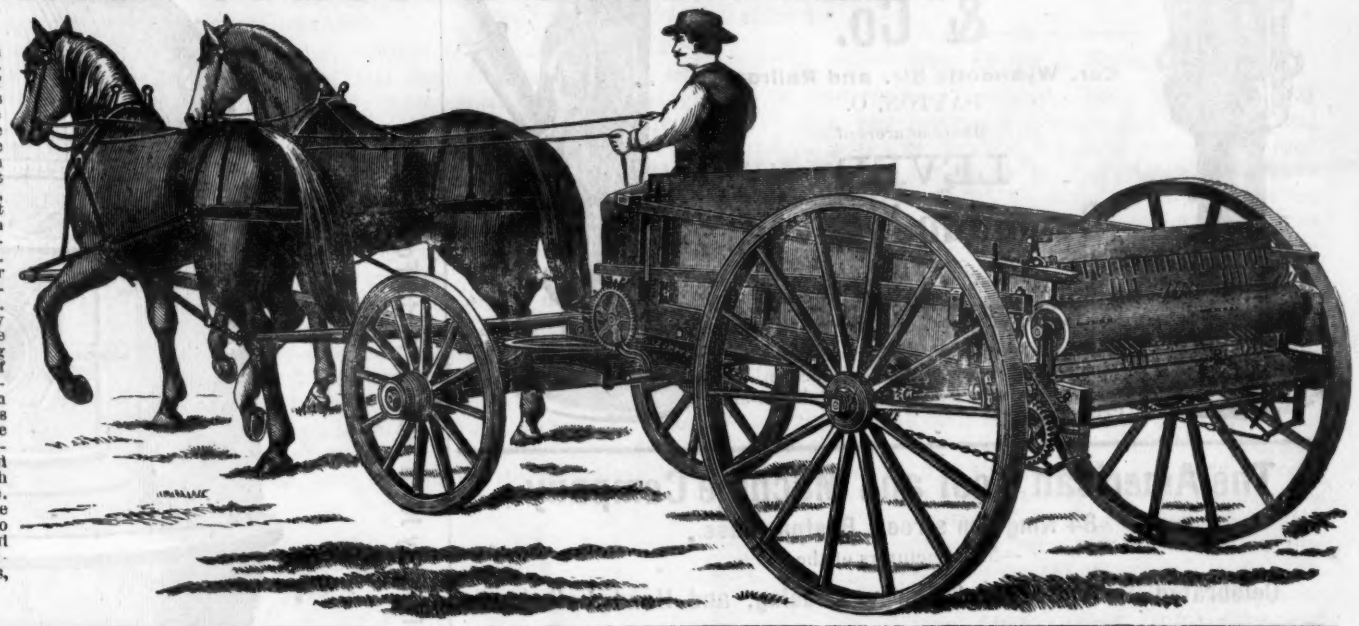

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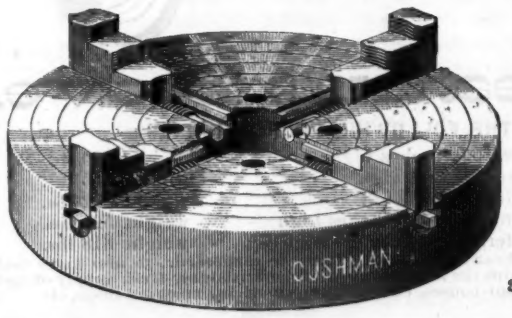

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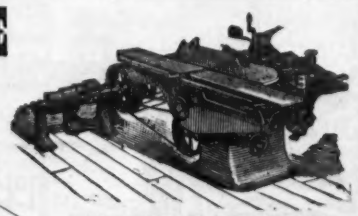

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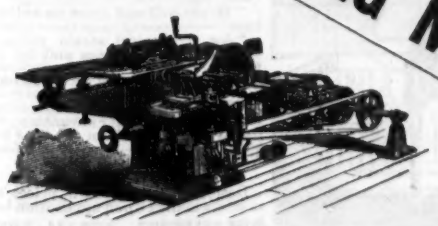

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FIVE SIZES OF THE FOLLOWING PROPORTIONS:

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No. 6, XX 30 inches in diameter, 3½ feet high - - -	weight 255 lbs.
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No. 8, XX 36 inches in diameter, 4 feet, 5 inches high -	weight 520 lbs.
No. 9, XX 36 inches in diameter, 4 feet 9 inches high - -	weight 818 lbs.

The above stove, for durability and heating purposes, cannot be surpassed. It also saves coal, from the fact that once heated up it retains the heat for a long time without a fresh supply of fuel. It is particularly adapted for hotels, school-houses, churches, large offices, machine shops, etc.

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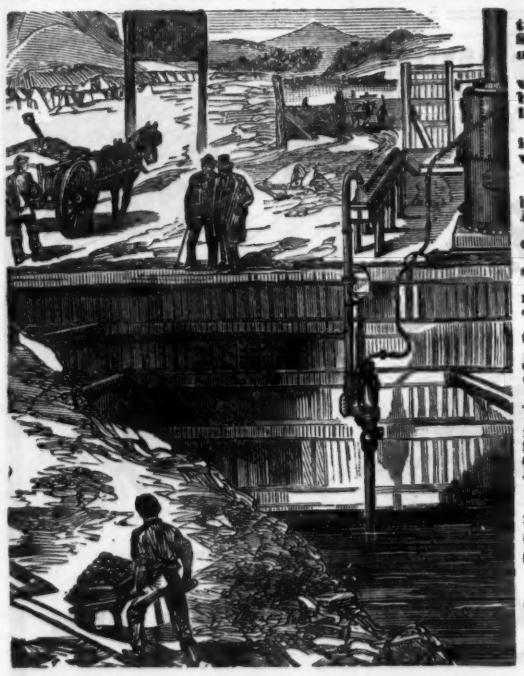

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It can be made useful in situations where no other pump could possibly be applied, owing to the small space it occupies.

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"An economical steam pump, both in consumption of steam and for repairs."—*Clark's Island Granite Works, Rockland, Me.*

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"Used three months for pumping out coffer dam, while under steamship *Holland*, we found it all you claim for it as to economy and simplicity."—*National S.S. Line, Pier 39, North River, New York.*

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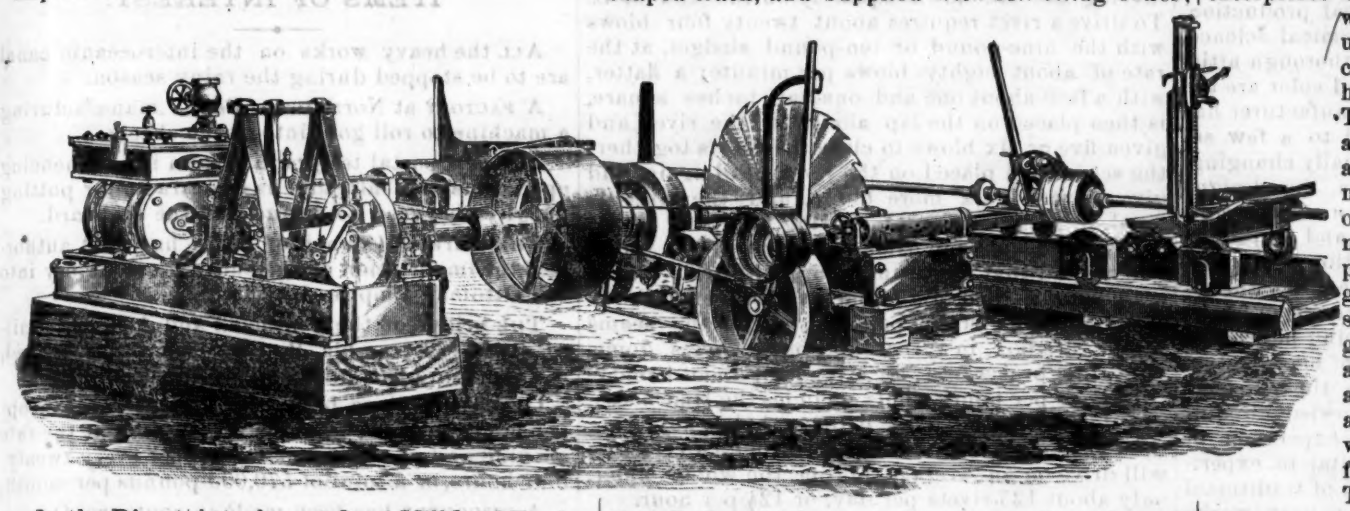
WARREN MACHINE WORKS.

Spangenberg, Pendleton & Co.

WARREN, O.

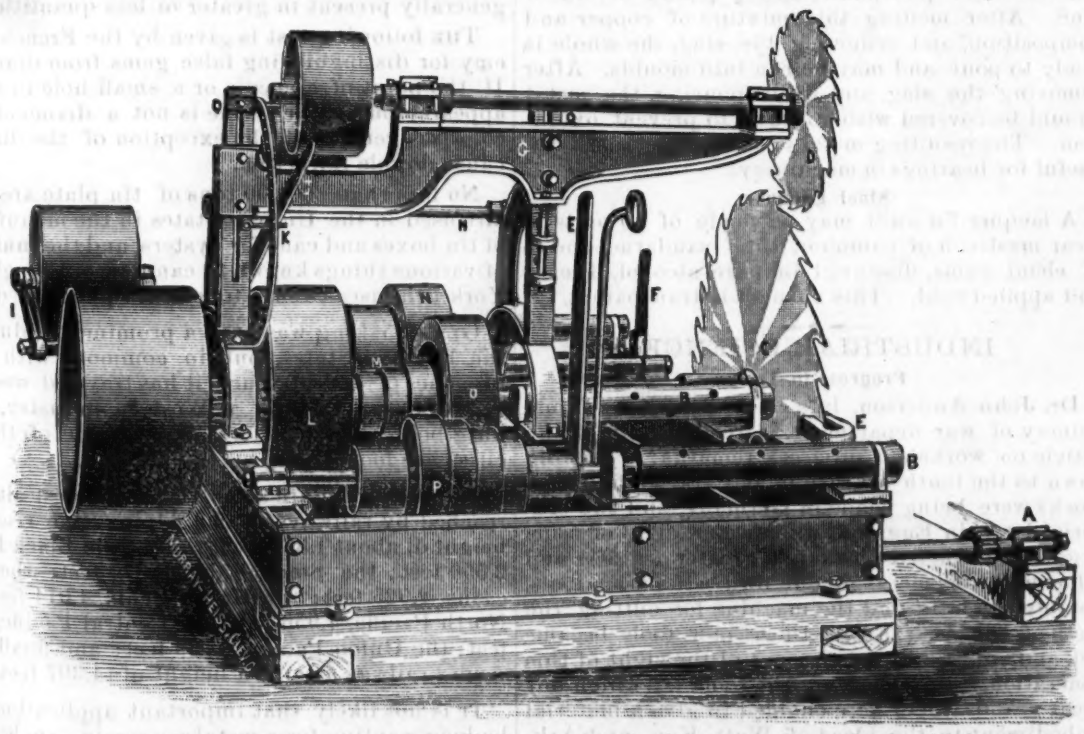
The lumber manufacturing interest is so important that improvements in machinery that expedite operations and economise production are necessarily of extended interest. Among the prominent establishments in this State concerned in supplying lumber-working machines is to be ranked the Warren Machine Works, Warren, Ohio, the proprietors of which are Messrs. Spangenberg, Pendleton & Co. The business was established twenty years since by Mr. Hull, the operations being carried on in a building known up to 1872 as the Franklin Machine Works. The present building was erected in 1872, by H. C. Reed & Co., who continued the manufacture of machines until 1872, when they failed. Their successor was Mr. Kinsman. The present firm entered on the business on the 1st of February of this year. The building is a three story brick, with a frontage of 50x90 feet; the foundry is 30x90 feet. The most important machines manufactured are the Direct Attachment and the Gear Mill, each possessing important mechanical features.



In the Direct Attachment Saw Mill and Engine manufactured at these works, the power is applied directly to the saw arbor, thus doing away with all the friction unavoidable in a belt mill. Two sizes of thesemills are manufactured, one with 9x12 and the other with 11x13 engines. These engines are designed to run at a high rate of speed, and are strongly and carefully built in every particular; large ports placed close to the end of the cylinder and double valves give rapid clearance, relieving the engine of back pressure and greatly increasing the power and economising the steam. The valve is moved by a return crank instead of the eccentric in common use, thus doing away with the great amount of friction unavoidable in an eccentric. Being fitted with brasses and gib and key it affords a ready means of taking up all lost motion incident to wear, and insuring a uniform and reliable lead and cut-off in the steam, thus securing the advantages due to the use of steam expansively. The correctness of the principle on which these engines are constructed is proved by the fact that many of them have run for years at an average speed of from 500 to 700 revolutions per minute, and with scarcely a dollar of expense for repairs, while the simplicity of their construction permits of their being operated by any man of ordinary intelligence.

The saw arbor to which we next direct attention, is made of the best hammered iron, extra heavy and turned throughout its entire length. In addition to the pulleys belonging to the mill proper it is provided with a pulley 15x30 inches, carefully balanced, from which belt may be run for driving other machinery if desired. The saw frame is iron, planed true, to which all the other parts are attached by means of adjustable boxes.

The sawyer's levers for operating log carriage and log turner are conveniently near each other, and all moving parts are so placed as to be at all times readily seen by the operator. The carriage is made of any desired length, with any required number of head blocks, and is all iron except the feed rack rail which is of seasoned ash. The front of the head-block rests on two wheels fitted to a V shaped track, and supplied with self-oiling boxes; the wheels which carry the rear end are flanged, making it impossible for the carriage to leave the track. An important feature is the dog which clamps both the upper and under side of the log at once, and is also so arranged that it will allow a crooked log to raise up and down without moving out from the head-block. The set is so arranged that the thickness of the lumber may be varied the 1-100th part of an inch if desired, and



is fitted with an index wheel which shows at all times the distance between the knee and saw; the exact number of pieces of any given dimensions that a log will make, and how a log should be slabbed to cut any given thickness without waste.

This firm also build a variety of belt mills, five different sizes in all, ranging from the pony mill designed to be run with threshing engines or other light power, to the large double mill calculated to do the heaviest work.

Their threshing engines have taken the lead wherever introduced and for beauty of design, economy in the use of fuel, durability and power are unsurpassed.

Messrs. Spangenberg, Pendleton & Co. build a full line of improved slide valve stationary engines of the truss or Corliss type of bed plate, and do a large business in special machines, including handle, spoke and baluster, lathes and hoop machinery.

Wm. Eynon & Sons.

Of late years Cleveland, like Cincinnati and Chicago, has become a great depot of the West, and a point of supply for both the North and South. The innumerable industries that have clustered in her midst, no less than the enterprise of her business men and capitalists, have rendered her a desirable point from which to obtain supplies. Admirably located, and commanding direct communication with every section of the country, her future promises to be a brilliant one, and the numerous new concerns that are springing up in her midst give evidence of the fact that shrewd business men are not slow to perceive and take advantage of the facilities she affords as a manufacturing site. Among the most noteworthy of her new enterprises we find the firm of Wm. Eynon & Sons, who have recently engaged in the manufacture of milling machines, index centres, centering machines, universal heads, universal vises, anddie sinking. The establishment is at No. 73 Scranton avenue, near Variety Iron Works, and are in a position to afford every inducement to the trade, their facilities being of the most thorough character. They make five sizes of milling machines, power feed, hollow spindle, and back gearing. These machines are constructed in the most substantial manner, great care being taken to secure a stiff and solid machine. All bearings are accurately scraped, no emery is used, and they are just that kind of tool which does exactly what it is intended for. Send for specifications and prices They guarantee first-class work.

FRICTION PULLEYS, CLUTCHES, AND HOISTING MACHINERY.

Volney W. Mason & Co.,

PROVIDENCE, R. I.

The works of Messrs. Volney W. Mason & Co., Lafayette street, Providence, R. I., which were established eighteen years since, are well known as largely engaged in the manufacture of their friction pulleys and friction clutches. The merits of the hoisting machine for elevators turned out by the firm, as well as their friction pulleys and clutches, were well characterized in the judges award, giving them two gold medals, at the Centennial Exhibition, as "compact" and with "well studied details." In addition to occupying moderate space, the machine both on account of its strength and the principle of construction, is absolutely safe. It can be promptly stopped, started, or reversed, and increased efficiency is the result of the arrangements by which compactness is secured. It is accessible in all its parts, and among its advantages the following may be enumerated: There is no shifting of belts; the shipping motion is easy and there is the least traverse of wire rope in shipping; the belts wear much longer than on fast or loose pulleys, and stretch less. The loose pulleys may be oiled, whether running or stopped, through the center of the shaft, and, being overhead, occupy less room and are easily belted. It has an independent stop motion and all bearings being contained in a single iron frame, are not liable to get out of line.

The friction pulley manufactured by the firm, and which was patented April 4, 1876, is operated by a lever connected to the groove in the thimble, in which groove is a loose ring, having two lugs or ears to which the lever is attached, and by a longitudinal movement of the thimble the two segments are operated, and thrown in or out of connection with the inner surface of the pulley, thereby communicating motion to the shaft. No form of construction could be more complete. The friction pressure allows of being equably adjusted, the toggle joint being regulated until the pressure is alike on each segment.

Simplicity and effectiveness characterize the mechanism of the clutches. The toggle lever concentrates the greatest power just when and where required in forcing the segments outward to pro-

duce pressure; also holds itself in when shipped in to drive without any longitudinal pressure on the thimble, and when unshipped the clearance increases very rapid, as the thimble is moved away from the plate, giving ample clearance between the friction surfaces by a moderate movement of the thimble in unshipping. There is no shifting of belts, and there is a saving in belting, only half as wide pulleys being required as with other clutches. These clutches can be started quickly or gradually by varying the movement of the shipper, working it quickly to start light running machines, and slowly to get up speed gradually in heavy machinery.

The firm employ 18 hands. Their chief shipments are to the southern and western States, but they have a considerable trade with the east. Among important elevator firms to which they regularly ship goods is the Union Elevator Co., of St. Louis.

IRONSTONE CHINA AND DECORATED WARE.

MORLEY & CO.

WELLSVILLE, O.

The higher branches of ceramic art properly occupy the very first rank in mechanical production, as involving the application of chemical science, superior manual skill and the most thorough artistic taste. Material, form, design and color are the elements with which the pottery manufacturer has to deal. Nor is his work confined to a few set types of pottery. Fashion is continually changing, and its course being dependent on the designs placed in advance on the market, the widest scope is given for bringing out graceful and attractive forms. The business of ornamentation presents a field in itself. The difficulties attending the attainment of excellence in pottery ware, the presence of so many conditions of success being necessary, have necessarily limited the number of manufacturers either competing or who have the capacity to be successful in this line. The knowledge requisite for eminence comes from the experience of years, the expenditure of large capital in experimental tests, and from the possession of traditional secrets. Messrs. Morley & Co., whose vast works are the pride of Wellsville, Ohio, stand at the head of makers in this country of iron stone china and decorated ware. It detracts nothing from their merit that they have at their command such admirable clays. A survey of their extensive works shows that every suggestion in the best home and foreign potteries have been put to account in modelling the structures, and in the multiform appliances of a mechanical character. Their white ware is recommended not only by its durability, hue and lustre, but by the exquisitely appropriate forms turned out. Their American majolica on white granite body is the only majolica anywhere on a No. 1 body, and they are the only firm who have ever made a sucess of burning majolica colors at a white granite heat, all other majollica being made on a very light, cheap body and burned at a very low heat. On this account alone it is far superior to any other in the market. Their decorated goods are unexcelled both in form, patterns and delicate richness of coloring. In their majolica and decorated ware every shade of natural objects that can enter into the composition is portrayed with the delicacy of a painting on canvass, whilst the raised forms afford a still greater semblance to the reality. In these sets may be seen wild flowers stems and leaves, trailing over willow or other patterns and contrasting admirably in tints and hues. There are small table pieces as pickle, fruit dishes, comports, apparently designed from the grouping of leaves, and in parti-colored hues as clear and bright as are ocean shells; in short, color is sported with, but with all its brilliancy so subdued as to produce pleasing and harmonious effects. We may cite as a specimen of art, a small bouquet holder in dolphin form which realizes the poetical description of the varied hues of that fish in its death throes. A shell salad dish may be noted for its exquisite contour and pellucid coloring, constituting a perfect gem; so also a leaf comport and an owl jug. These services are things of beauty, and heighten the attractions of the table and the gastronomical pleasures. In originality and skill of treatment the decorated ware of Morley & Co. rivals the celebrated productions of the English makers Minturn & Co., and the famed ware of Limoges. The dining room plaques of the firm are triumphs in their way. They are all appropriate, but among them we must notice fish strung in pairs with colors true as life, and scales, fins and eyes rendered with remarkable fidelity.

Fortunately this firm, which has heavy contracts on hand for all descriptions of its wares, has not been affected in any way by the late labor troubles which have caused the East Liverpool potteries to be closed for the past three months, and they have been running with full force the whole time, consequently now have a full stock in every department and are capable of filling all orders entrusted to them promptly. One feature characterizing the business of Messrs. Morley & Co., and which greatly encourages dealers to order from them is that all goods are guaranteed and to be such as represented. The members of the firm are Messrs. Geo. Morley, Isaac B. Clark and Harmon Michaels.

MECHANICAL RECEIPTS AND ITEMS.

Riveting in Locomotive Boiler Work.

The operation of "driving" rivets consists in placing a set on the end of the rivet, and sledging it down to form the head. The rivet is not struck direct by the sledges at any time during the operation of driving, but the head is formed entirely by driving the set down squarely on the end of it. To drive a rivet requires about twenty four blows with the nine-pound or ten-pound sledges, at the rate of about eighty blows per minute; a flatter, with a face about one and one-halt inches square, is then placed on the lap alongside the rivet, and given five or six blows to close the sheets together; the set is then placed on the rivet head again, and given five or six more blows, and the rivet is finished, the operation of driving requiring about thirty-five seconds of time to the rivet. In practice we find that a riveting gang will drive in the seams of the shell of a boiler an average of thirty rivets per hour, or 300 per day, and in the seams of the fire-box, in throat and back sheets, dome, mud ring, braces, etc., an average of about twenty-two rivets per hour. This includes the time necessary for taking out bolts, drifting holes, adjusting the tools and work. In hand riveting, two riveters will drive on an average, taking the whole boiler, only about 125 rivets per day, or 12½ per hour.

New Process for Hardening Copper.

Mr. A. C. Getchell, of Boston, Mass., claims that he can harden copper and convert it into an antifrictional metal by the following process: The copper is first heated to about redness in a crucible, and a composition is then added which, for twenty-five pounds of copper, consists of 1½ pounds of potash or soda, 1 pound of alum, ¼ pound of bone dust or other phosphate, and ¼ pound of tin or zinc. After melting this mixture of copper and composition, and removing the slag, the whole is ready to pour, and may be run into moulds. After removing the slag, and while pouring, the metal should be covered with charcoal to prevent oxidation. The resulting metal is said to be especially useful for bearings in machinery.

Steel Lacquer.

A lacquer for steel may be made of 10 parts of clear mastic, 5 of camphor. 15 of sandarac, and 5 of elemi gums, dissolved in pure alcohol, filtered and applied cold. This varnish is transparent.

INDUSTRIAL SCIENCE.

Progress in Tools.

Dr. John Anderson, late Superintendent of machinery of war department, Great Britain, in an article on workshop progress remarks: Coming down to the tenth century of our era, we find that clocks were being made in Germany, and two centuries later, in England, when a new class of tools began, constructed with much greater neatness and refinement—elements of our own self-acting tools, notably the lathe and the machine for cutting the teeth of wheels. In time those new tools became old, and are rapidly passing out of the sight of this generation. But they are the tools by which our great grandfathers were enabled to give a material embodiment to the ideas of Watt, Kay, and Arkwright. They are now almost entirely replaced by automatic tools, creations of Maudsley, Roberts, Sir I. Whitworth, James Nasmyth, and many other great men, both of this and past generations. Although in a short paper it would be impossible to go into details of the various classes of tools that are to be found in almost all workshops, still there are a few points of a general nature that may be referred to if only to show the philosophy which underlies and pervades them all. In the automatic or self-acting tools of this generation the great distinguishing feature of the larger number is this—that when once the tools are in working order they do not depend upon the attendant for the result. This condition is obvious in the tools of the textile manufactures, and almost equally so in the class of tools that are employed for the treatment of metal, wood and stone. In automatic tools, when considered in a general way, there is a family likeness running through them all, not so much in the outward appearance as in the principles of action, and still more in their adaptation to trace out the required form or pattern from a permanent copy embodied in the tool by a process of transfer. In the intelligent examination of such mechanism, the first thing to observe is the manner in which this leading feature has been developed. It will be interesting to compare in each separate tool how the primary idea of copying the form has been embodied in the material structure, because this is the very point where man shows his superiority for ingenuity, skill, craft or taste. Although the ways in which the idea of copying is embodied are innumerable, still it will be found that in almost each case, the means employed are exceedingly simple.

ITEMS OF INTEREST.

ALL the heavy works on the interoceanic canal are to be stopped during the rainy season.

A FACTORY at Norristown, Pa., is manufacturing a machine to roll gold into tissue sheets.

THE new postal telegraph system is commencing operations, and already has contracts for putting up wires between Cleveland and the seaboard.

THE Turkish Council of State has just authorized the importation of agricultural machinery into the Ottoman Empire, duty free.

THE bridge of the Pensacola and Atlantic Railroad across Escambia Bay, Florida, lately opened, is a structure five miles and a quarter long.

OPERATIONS have been begun by the Globe copper mine, Arizona, which is turning out at the rate of nine and one-half tons of copper every twenty-four hours, or a total of 570,000 pounds per month.

A DISCOVERY has been made in southern Oregon of a large deposit of nickel ore, resembling that discovered in New Caledonia in 1864, the development of which by the French has so greatly extended the economical use of this metal.

IT has been noticed that copper, when melted with salt, and subsequently cooled, is much tougher than ordinary copper, this being due, in all probability, to the removal of the cuprous oxide which is generally present in greater or less quantities.

THE following test is given by the French Academy for distinguishing false gems from diamonds. If the point of a needle or a small hole in a card, appears-double, the stone is not a diamond. All colorless gems with the exception of the diamond cause double refraction.

No less than 800,000 tons of tin plate are annually used in the United States in the manufacture of tin boxes and cans for oysters, and the multitude of various things known to canners. A single New York firm uses twenty tons of tin plate per day.

GLASS making was once a prominent industry in the Eastern States, but in common with other branches of manufactures it has traveled westward and is now peculiarly a Western industry, Pittsburg being headquarters, while some of the lake cities are looming up as competitors.

THE following are some of the greatest altitudes reached by railways: The Alpine line rises to a height of about 1,851 feet; that of the Black Forest, 2,550 feet; the Sœmmering, 2,670 feet; the Caucasus, 2,925 feet; the Mount Cenis, 4,014 feet; the North Pacific, 4,956 feet; the Central Pacific, 6,420 feet; the Union Pacific, 6,939 feet; and finally the Andes railway attains a height of 14,307 feet.

IT is not likely that important applications will be long wanting for a metal possessing such valuable properties as malleable nickel, the price (about $1 a pound) being comparatively low. Malleable nickel anodes are being already substituted for the old cast anodes. The former certainly have great advantages in their uniformity of structure, which not only prevents to a great extent their being eaten away irregularly but also avoids loss through secondary currents. The greater rarity and consequently higher price of cobalt precludes its general use in the metal state. It is, however, said to be used for electro-plating, the articles coated with it being sold as superior nickel plate.

Cleveland Business Directory.

Assayers and Analytical Chemists.

JUDSON, W. E, Ana ytical Chemist, 8 Cushing Block.

Bolt and Nut Works.

HOTCHKISS & GAYLORD, manuf'rs. Machine, Plow & Elevator Bolts, Coach Screws.

Boiler Makers.

SMITH & TEACHOUT — (Established 1857.) Boiler, Tanks, Stills etc. 489 Broadway.

Bridge Builders.

BUCKEYE BRIDGE AND BOILER WORKS mfrs of Arch & Truss Bridges, Boiler Tanks and Oil Stills. Bet. Wasson St. and Case Ave.

Coal and Iron Exchange.

JACKSON IRON CO. Iron Ore and Pig Iron. Rooms 8 and 9. Fayette Brown, Gen. Agent.

RHODES & CO. Coal, Iron Ore an Pig Iron. Rooms 1 and 2.

Carriage Blacksmith.

STRIEBEL, CHAS. manfac'r. of Carriages and Wagons and platform trucks. Horse shoeing and general blacksmithing .93 Woodland ave.

Carriage Bolts.

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts.

Church and School Furnture.

FAULHABER, GEO. manufacturer of School and Church Furniture. Fine Hard Wood work a specialty. 208 Ontario Street.

Custom Boots and Shoes.

ROONEY, JOHN manufacturer of hand-made Boots & Shoes, custom made and warranted 177 Ontario Street.

Carriage Repository.

GREENE'S, J. O., Carriage Repository, 408 Superior street and 52, 54 & 56 Rockwell street, dealer in Fine Carriages. Repair shop in connection.

SLATER, G. A., Carriage dealer, sells the best work for the lowest price. A fine assortment always on hand. Repository 365 Euclid Avenue.

Coal and Pig Iron.

ANDREWS, HITCHCOCK & CO., Briar Hill Coal and Pig Iron. 122 Water Street.

Electrical,

ELECTRIC SUPPLY CO. manfrs and dealers in Electric Burglar Alarms, Annunciators, Cell Bells and Batteries. Telephone lines built and repaired. 145 Seneca Street.

Fresco Artists.

KEMMER & KUSHMAN DECORATIVE CO., Fresco Artists, Fine Modern Wall Papers. 338 Euclid ave.

Foundries.

BOWLER & CO., Car Wheels, Patent Chilled Frogs, and all kinds of castings. 9 Winter.

CLEVELAND MALLEABLE IRON CO., manufacturers Malleable Iron Castins.

LAKE SHORE FOUNDRY, Water and Gas Pipe, Light and Heavy Castings. Alabama st.

TAYLOR & BOGGIS, successors to H. & H. F. Taylor, Iron Founders, 65 to 73 Central Way.

VIADUCT FOUNDRY COM'Y, Aenis, Carlin & Strangward manfrs of Machinery Castings fine Light Castings a Specialty. Office & Works 11 13 15 and 17 Detroit Strert, near Center.

FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway.

File and Saw Works.

PARKIN, W. H. & CO., Hand-cut Files and Rasps, dealers in Disston's saws, 11 So. Water

Flue Cleaner.

CLEVELAND FLUE CLEANER M'F'G. CO. manufacturer of Aitchison & Doolittle's Patent Steam Flue Cleaner, 22 & 24 Power Block.

Hotels.

FOREST CITY HOUSE, cor. Public Square and Superior st., Terrill & Ingersoll, Props.

KENNARD HOUSE, D. McClasky, Prop.

NEW ENGLAND HOTEL, Water st., W. W. Wolcott, Prop. Refitted and refurnished.

STRIEBINGER HOUSE, between Ontario and Seneca sts. $2.00 per day. Hawley & Langton

CITY HOTEL, Seneca street. H. B. West, proprietor. $1.50 per day.

Hides, Pelts and Leather.

DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow. 48 and 50 River street.

Hardwood Lumber.

MARTIN, J. T. dealer in Hardwood Lumber, Stone's Levee, near Central Way.

Lumber.

WOODS, PERRY & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter st.

FISHER, WILSON & CO., wholesale lumber dealers (pine & hard wood), rough and dressed umber, timber, lath, shingles, etc. 47 Central Way

KRAUSE, C. A., & SON, wholesale and retail dealers in lumber. Yards cor. Superior and Wason and 281 Merwin streets.

Cleveland Business Directory.

Hardware and Iron.

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water street.

CLEVELAND ROLLING MILL CO., manuf'rs. of Steel and Iron Wire and Steel Tire.

WORTHINGTON, GEO. & CO., Hardware and Dealers in Metals. Water street.

Lime Manufacturers.

RUSSELL LIME CO., manufacturers of White Lime; also dealers in Plaster, Cement, etc. 85 Elm street.

Machinery and Boilers.

CLEVELAND STEAM FURNACE CO., Engines and Boilers, cor. Detroit and Center sts.

KRITCH, K. E. Metal Pattern Maker. Small machinery repaired. Lawn Mower sharpening a specialty. 42 South Water Street.

Machinery Depot.

CLEVELAND MACHINERY DEPOT, (now National Machinery Depot.) The largest stock of New and Second-hand Engines, Boilers and Machinists' Tools. Shop and Warehouse corner Bond and Superior streets.

Mercantile Agency.

THE MERCANTILE AGENCY. R. G. Dun & Co. proprietors. 121 Superior street.

Oil Manufacturers.

AMERICAN LUBRICATING OIL CO., manufacturers of lubricating oils. 23 Euclid ave.

Paints and Oils.

MASTERS, J. N. jobber in Paints, Oils, Varnishes. Brushes, 34 Prospect st.

Pattern and Model Makers.

WHITTINGHAM, J. & C., Metal Pattern and Model makers 52 Canal Street.

REID, J. C., Pattern and Model Maker. 52 Canal Street., (Up Stairs.)

COTTRELL & CO., W. L., Pattern Makers, 53 Center street.

STAIR BUILDER.

PFEIL, CHAS, Stair Builder; Hard Wood Mantles and Office Railing. Works, 49 & 51 Canal street, Cleveland, Ohio

JOHNSON & PURSER, Stair Builders. and manuf'rs of Mantels, Odd Pieces of Furniture, &c. 30 West street, up stairs.

Steel Stamps and Stencils.

FLEHARTY, J. H. & CO., Rubber Stamps, Seals, Stencils. 197 Superior street.

Steam Furnaces.

CUYAHOGA STEAM FURNACE CO., Manfrs of Land and Marine Engines. Machinery for Blast Furnaces, Rolling Mills, Bessemer Steel Works, &c. Mill-Gearing and all kinds of Castings, Foundry, Machine and Boiler Shops.

Tanners.

GAENSSLEN BROS., Tanners, and dealers in leather, oil and shoe findings. 80 Water-st.

Trunks and Valices.

FABER, J. manuf. Trunk, Traveling Bags and Ladies' Fine Satchels. Sample Trunks and Cases a Specialty. 56 Public Square.

Vessel Agents.

WEBB, H. J. & CO., Ship Brokers and Vessel agents. 17 & 18 Board of Trade Building. 122 Water Street.

Wood Carving.

HERKOMMER, J., Carver and Ornamenter in Composition. 225 Erie street.

Business Directory.

Akron, O.

AKRON IRON CO., manufacture best Common, Refined and Charcoal Iron.

CASCADE HOUSE, cor. Mill and Summit sts., near Depot. J. Downie, Prop.

MCNEIL, J. C., Steam Boilers, Heavy Sheet Iron Work. Repairing promptly executed.

PERKINS, C. E., dealer in Agricultural Implements, machinery, and Manufacturers' Ag'nt

TAPLIN, RICE & CO., manuf'rs. of Stoves and Hollow Ware, dealers in Tinners' Stock, etc.

WEBSTER, CAMP & LANE MACHINE CO., Founders and Machinists, 12 Main street.

AKRON POLISHING & PLATING WORKS. Man'f'rs of solid leather wheels for polishers.

Alliance, O.

ARLINGTON HOUSE, cor. Main and Liberty Streets. Centrally located. Sample Room for Commercial Travellers. H. S. Adams, proprietor

MCFARLAND, J. W. Engine and Machine Builder, and General Machine Jobbing

Cuyahoga Falls, O.

THOMAS BROTHERS, manfrs of Ohio Stone Ware. Cuyahoga Falls Stone Ware Factory, cor. Main and Broad streets,

TURNER, VAUGHN & TAYLOR, manufacture engines, presses and grinding machinery for clay; also paper, chain, wire and flour mill machinery. Send for Circulars and price list.

SNYDER, H. wholesale manu acturer of Sash, Doors, Blinds, &c. Send for Price Lists.

THE CUYAHOGA FORGE AND IRON CO., manfrs. of every description Car, Truck and Driving Axles, Forging, Shafting &c.

Canal Dover, O.

HECKMAN, E., manufr. and dealer in harness leather, upper, kipp and calf. Also, manufacturer & dealer in prime English Dairy cheese. Highest market cash price paid for hides.

Business Directory.

Columbus, O.

PAT. ADJUSTABLE WINDOW CURTAIN Cornice, manufactured by Strader's Curtain Cornice Works.

ROYCE & PULLING manufrs of Patent Steam Pumps for all purposes. Store room 90 High street. Works Nos. 5 and 7 Scioto street.

U. S. CARRIAGE CO. builders of fine Carriages, Buggies and Phætons. Salesrooms and Office 257, 259 and 261 Fourth street.

REYNOLDS BROS., manufacturers of hand-cut Files and Rasps. Old files re-cut. Send for Price List.

CITY BOILER WORKS, manfrs of Stationary, Portable and Locomotive Steam Boilers. All work warranted. Borger Bros. & Co.

MURRAY, HAYDEN & CO., manfrs of Malleable Iron. Cor. Randolph & West streets.

Canton, O.

DIEBOLD SAFE & LOCK CO., manuf'rs. Safes, Locks, Bank and Safe Deposit Works.

NOVELTY IRON WORKS, Mill work, Shafting, engines, Imperial job printing press, etc

NEW AMERICAN HOUSE, Canton. Fred. Hipp, Prop.

EBERSOLE & KAILEY, Machine and Jobbing Shops. Gearing for Patterns or Machinery a specialty. Models of all kinds made & repaired.

Geneva, O.

THE ENTERPRISE MACHINE CO., L. L. Crane, Pres't, manfrs of Machinists' Tools and Machinery. Gear Cutting a specialty.

Lima, O.

LIMA HOUSE, centrally located; telegraph office in the house. J. Goldsmith, Prop.

Massillon, O.

CITY CARRIAGE WORKS, P. H. Young, prop. manfact'r of Carriages, Phætons and Spring Wagons. Work warranted. Cor. Tremont & Erie.

Painesville, O.

NORTH AMERICAN CUTLERY CO., m'fr's of Steel Shears and Scissors—best quality.

Ravenna, O.

THOMPSON, T. F., dealer in Agricultural Implements, farm machinery, hardware, seeds, fertilizers, &c. Cor. Main and Prospect sts.

BALDWIN, D. L. & SON, Contractors & Builders and manfrs of all kinds of Moulding, flooring, siding, &c. Rip, Band and Scroll Sawing.

Steubenville, O.

DORRANCE, D. W., Tool Works, manufacturer of hand-made miners' and stone-cutters' Tools Promp attention given to mail orders.

Sandusky, O.

SANDUSKY WHEEL CO. manfrs. of Sarven Patent Wheels, Carriage Bodies and Seats, Plain Wood Hub Wheels, Banded Hub Wheels, Jacobs' Patent Neck Yokes.

Toledo, O.

BAKER, HERBERT, Machine Shop and Iron Foundry. 98 and 100 Erie street.

TOLEDO FOUNDRY AND MACHINE CO. builders of Steam Engines, Circular Saw Mills and all kinds machinery. Water St., cor. Cherry

RUSSELL IRON WORKS, mnfrs. of Architectural Iron Work, castings, pulleys, shafting and steam bending machinery. Cor. Water and Lagrange streets.

STANDARD SAW WORKS, H. Bartley, manufacturer and dealer in Saws of every description All kinds of Springs made from Sheet Steel. Reaper, Hay Knives Truss Springs, &c. made to order. 92 St. Clair Street.

UNION Wooden Ware Manufacturing Co. manufacture Sewing machines, washboards, children's wagons, carts, wheelbarrows, sleds, kitchen wooden ware, &c.

HEPBURN BROTHERS, proprie. Union Boat Works. Boats of all kinds made to order. For sale or rent. Water Street foot of Cherry.

Youngstown, O.

BELL, EDWIN & SON, manuf. of Nail Kegs, Pat. coiled hoops, slack barrel and keg heading and oil barrel stock.

DINGLEDY, G. H. dealer in rough and dressed Lumber, Shingles and Lath.

MORTON HOUSE, formerly Maitland House, James Morton, Prop.

TOD HOUSE, cor. Diamond and Market streets. Henkel & Bowman, Props.

Zanesville, O.

KIRK HOUSE, William Kirk, proprietor. $1.50 per day.

Rochester, Pa.

OLIVE STOVE WORKS, (limited) manufacturers of Stoves and Hollow Ware.

Erie, Pa.

GUNNISON, A. B., wholesale manufacturer of Wood Pumps. 233 East Twenty-Second St.

BALL ENGINE CO., limited, manufacturers of Automatic Engines of 15 to 80 horse power

NOBLE SEWING MACHINE CO. manfrs of the New Noble Sewing Machine. Send for circulars and prices.

A. B. FELGEMAKER & CO. Church Organ build'rs. Descriptive catalogue furnished on application.

Business Directory.

Titusville, Pa.

FOSTER & McKAY, dealers in boilers and engines, tubing, casing, old iron, rope, and all kinds of metals. Washington street, nr. Railroad.

Meadville, Pa.

CURRY & CO. general Jobbers in Castings of all kinds.

Oil City, Pa.

REID, JOS. Machinist, steam engine and pump repairing. Brass and iron castings, light and heavy, made on short notice.

Sandy Lake, Pa.

EBERMANN, W. S. & SONS, manfrs. of the celebrated Ebermann Boiler Feeder. Send for Circulars and Price List.

Pittsburgh, Pa.

PRINTING PRESSES. W. A. Bunting, manufacturers' agent. Printers supplies, type, cards. 42½ Sixth Street. [Up stairs.]

BAIR & GAZZAM, practical machinists; gear cutting a specialty. Rice's Feed Water and Heater. 17 Wood street, corner First Avenue.

Wheeling, W. Va.

EXCELSIOR MACHINE WORKS, Redman & Co., general machinists and manufacturers of Marine and Stationary Engines, Hangers, Pulleys, Shafting, &c. Cor. 18th & Chapline streets.

Louisville, Ky,

HAIGHT, ROBERT, Gold, Silver and Nickel Plating and Brass Finishing Shop. Car Trimmings and Steamboat work a specialty. 1 West Market street

Union City, Ind.

LAMBERT, J. W. & CO., mfrs of fork, rake, hoe and broom handles; spokes, hubs, whiffletrees, yokes, plow-rounds, &c. Correspondence solicited.

Olean, N. Y.

MYRICK BROS. & CO., manufact'rs Engines and Boilers, oil drilling tools, rig irons, etc.

Rochester, N. Y.

GOWE, JNO. N., mfrs. of Specialties, such as Machine forging, bridge bolts and trusses, railroad switches, spike, mall, chisels, &c.

ELEVATORS for Hotels, Factories and Private Houses. J. S. GRAHAM & CO.

WOOD-WORKING MACHINERY. Send for Catalogue. J. S. GRAHAM & CO.

RAZOR STROPS. Sole mfrs. of all kinds of Razor Strops. Uischt, Linn & Co. 131 N. Water

Buffalo, N. Y.

SANDS, PAUL, Marine and Stationary Steam Engine Works mfr. of drilling machines, foot and power lathes. 70 Columbia street.

EMPIRE STATE MF'G CO., O. F. Swift, prop'r, manfr of Fluters, Sad Irons, Spun Copper & Half Copper Tea Kettles. Washington, cor. Ohio

WHITE, L. & I. J. manf'r's of Coopers' Tools, Carpenters' Tools, and Ship Tools Also manf'r's of Planer Knives and Machine Cutters to order 310, 312, 314 Exchange street.

THE BUFFALO NUT AND BOLT CO [Limited.] Manufrs. of Hot Pressed Nuts, Bolts, Washers, Rivets, &c. No. 226 Ohio Street.

Rheims, N. Y.

GREAT WESTERN CHAMPAGNE. Finest made in America. Equal to best imported. Has taken highest awards everywhere, and is used all over the Continent. Try a case, and you will have no other. Pleasant Valley Wine Co., Rheims, N. Y.

Brattleboro', Vt,

A JOY FOREVER!

ESTEY ORGANS

Manufactured by

J. ESTEY & CO.,

Brattleboro', Vt.

(Catalogue free on application.)

CLEVELAND ELECTROTYPE FOUNDRY 55 FRANKFORT STREET CLEVELAND, O. 55

CLEVELAND NON-CONDUCTING CO.

MANUFACTURERS & DEALERS IN ASBESTOS, HAIR FELT, CEMENT, & OTHER

Pipe Coverings,

19 SOUTH WATER STREET, CLEVELAND, OHIO.

THE MORGAN

Variable Blast Water Tuyere Iron.

With the front plate removed, showing the rotating air tubes through which four different currents of air may be passed thereby making any sized fire from two to eighteen in. diameter.

I. actually saves one-half of the coal; makes an intense heat just where it is needed, and burns no coal unnecessarily Always gives a centre blast, and cleans all the dirt from the fire. Supplies hot water

We also furnish a Tuyere on same principle without Water Attachment. All goods guaranteed to please or no sale. Catalogue sent free. Address,

A. W. MORGAN & CO.
52 Vance Block, Indianapolis, Ind.

AMERICAN
LUBRICATOR CO.

A NOTICE
To the Public, by Jas. B. Ervin, their Atty:

MILWAUKEE, Wis., June 16, 1882.

The circulars of the Seibert Cylinder Oil Cup Co. and the Detroit Lubricator Manufacturing Co., to which my attention has been called, have been carefully considered.

It is obvious that were the boastful claims contained therein TRUE, said companies could at once enjoin all other lubricator companies and monopolize the entire lubricator business.

That they do not put their threats into execution, is presumptive evidence that they do not believe they can, while an examination of the official records and decisions conclusively prove that they cannot do so, and that their boasted claims are UNFOUNDED.

All the latest decisions of the Supreme Court hold that all re-issue patents which are not for the same invention as that of the original patent are VOID, and in the recent case of Heald vs. Rice, in the United States Supreme Court, decided March 6, 1882, O. G. 1443, it is unequivocally decided that a patent for a machine CANNOT be re-issued for a method or process, notwithstanding this fact said Seibert Company have dug up an old patent for a worthless and impractical thing, which was granted to John Gates, of Oregon, in 1870, and had it re-issued in three subdivisions, for a method or process of displacing oil by hydrostatic pressure, under which patents their BOASTFUL claims are made All of which patents are, beyond all question, null and void under said late decision. In said case referred to the original patent was for a boiler, while the re-issue is for a method or process of burning straw in a boiler. The Court said: "These two inventions are distinct and a patent for the boiler CANNOT be re-issued for the method or process of using it."

The decision to which said Seibert Co. refer as being in their favor has also been examined and it is found that it does not in any way involve the use of "sight feed" as claimed by them, but instead it simply involves the right of an assignee of a patent to bring suit on the same.

It follows then that the so-called decision in favor of said Seibert Co. is a myth so far as it goes to support said re-issued patents.

In regard to the pretentious claims of the Detroit Lubricator Manufacturing Co. for the sight feed they are fully answered by the patent to John Amsterdam, dated November 21, 1854, in which both hydrostatic pressure and the sight feed were first shown and fully described, conclusively proving that the claims of both Seibert and the Detroit Lubricator Manufacturing Co. are anticipated by many years and are therefore without foundation.

In view therefore of the said patent to Amsterdam, which has long since expired, it follows that all subsequent patents are based upon the peculiarities of construction only.

I find from the official records that among the earliest patents is the one owned by the American Lubricator Co., dated November 14, 1876, the cut and claims of which are here shown.

The official records show that the following essential elements were first made and patented by John H. and J. V. Renchard the proprietors of the American Lubricator Co., viz.: The Water Seal Tube, C, communicating between the condensing chamber and the oil cup; the Vertical Steam Tube, A, communicating with the steam pipe; and the Single Supporting Bar or Trunk, B, having separate steam and oil passages; all of which parts are broadly covered by the American Lubricator Co.'s patents, dated November 14, 1876, and September 20, 1881.

In behalf of said American Lubricator Co. the public are hereby warned not to purchase any lubricators having any of these elements. It is an indisputable fact that a large number of lubricators are now on the market in which some one or all of said devices and various equivalent devices, which involve the same principal are used, and the public are hereby notified that they will be held to a strict account for every violation of the rights of said company.

AMERICAN LUBRICATOR CO.,
Detroit, Mich.

FIGURE 1.
Represents Our First Original Form.

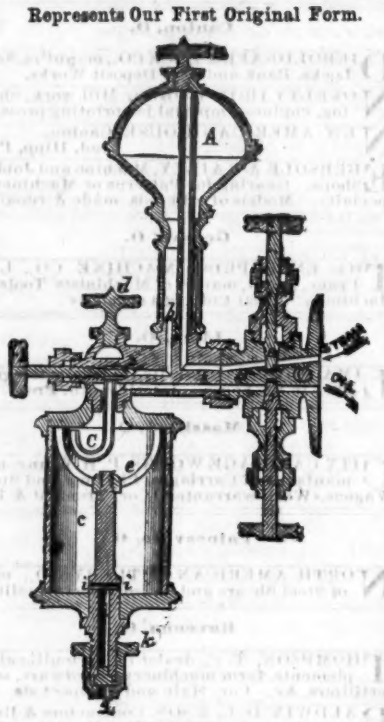
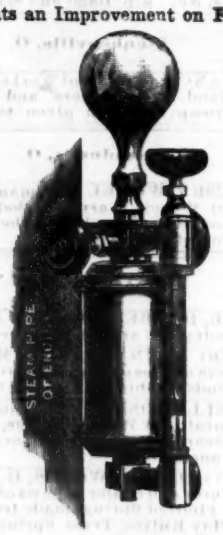


FIGURE 2.
Represents an Improvement on Form 1.



The Following is a True Copy of Our Claims:

1. In a displacement-lubricator having separate oil and water reservoirs, a single supporting-trunk provided with separate oil and steam passages, communicating, respectively, one between the oil-reservoir and steam-pipe, and the other between the steam-pipe and water-reservoir, substantially as and for the purpose specified.

2. In lubricators, a curved tube adapted by its curved shape to form a fluid-trap, having its mouth or entrance connected with the upper reservoir and its discharge-orifice terminating upwardly in or near the upper end of a transparent oil-receptacle, as adapted to discharge the water or other fluid received from the upper receptacle within the volume of oil or other fluid in the lower receptacle, while it prevents an interchange of the respective fluids, substantially as and for the purpose set forth.

3. In displacement-lubricators, the combination of a water-reservoir, a supporting-trunk having separate steam and oil passages arranged horizontally at right angles to said reservoir, a fluid-trap having its discharge-orifice turned upwardly, and a transparent oil-receptacle, said fluid-trap being adapted to receive the water from the water-reservoir and discharge the same in visible drops within the volume of oil, substantially as and for the purpose set forth.

4. In lubricators, the combination of a supporting-trunk having separate steam and oil passages, a condensing-chamber or water reservoir supported upon said trunk, and a steam-tube vertically arranged within said reservoir, in communication with the separate steam-passage of said trunk, and adapted to conduct the steam therefrom to the top of the condensing-chamber and discharge the same above the water, while it excludes the water from the steam-passage, substantially as set forth.

5. In a lubricator, the combination of a water-reservoir provided with a steam-passage which conducts steam from the steam-pipe to said reservoir, whereby a condensing-chamber is formed therein, a transparent cylinder located below the water-reservoir, an inverted siphon-tube, and a water-supply-regulating valve arranged and adapted to govern the flow of water from the water-reservoir to the siphon delivery-tube within the transparent cylinder, substantially as set forth.

6. In lubricators, the combination of the supporting-trunk having separate steam and oil passages, a water-reservoir attached to the upper side of said trunk, a tube for supplying steam to the upper end of said reservoir, a glass cylinder connected with the lower side of said trunk, a siphon-tube or water-seal suspended from said trunk within said glass cylinder, and a water-passage provided with a governing-valve, said passage communicating from the neck of said reservoir to the entrance of said siphon-tube, all substantially as and for the purpose set forth.

Read the Following:

We also take pleasure in informing our patrons that we have lately received several new and useful patents on Lubricators, one of which is a black-seed Lubricator, showing the drop of water passing up through a transparent water-indicator tube. This Lubricator is in construction a fac-simile of our present design,

FIGURE 3.
Represents Our Present Perfect-Design.

and we claim it to be the most perfect black-seed Lubricator in the market. It is simplicity itself.

In the construction of the American Lubricators, we have carefully avoided all complication by a scientific and ingenious arrangement of the parts, and confined the whole within a compact and durable form, discarding all piping and trappery usually seen on Lubricators, and which are a constant annoyance from leakage and are anything but graceful in appearance.

The American Engine Oil Cup, another late product of the American Lubricator Co., we wish to call your attention to, which are used for Lubricating *Cross-heads*, *Eccentric* and *Crank Pins* of every description. They are made with the same precision as the American Crank-pin Oiler and of the same sizes, and are intended to take the place of all the objectionable *traps* now employed. It is believed that something reliable, economical and cleanly must in time supercede the present unreliable and shabby appliances so extensively, yet so reluctantly, used. The American Engine Oil Cup is of the *finest* construction and well worthy the attention of engine builders and engine users. It is of the same design as the Crank-pin Oiler, as regards the shape and sizes of the Oil receptacle portion, and, accordingly in perfect conformity with it, the connecting ends are of the same sizes, with their relative numbers as those of the Crank-pin Oilers. It has been deemed best to thread them to standard sizes of pipe threads, which will also have the good effect to regulate the various screw threads now generally used on different makes of engines, and it also establishes a standard in this direction and permits us to send a complete Oiler ready to be attached.

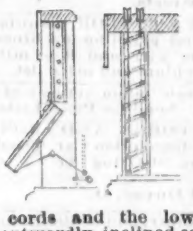
We shall issue *our new Illustrated Pamphlet about October 1st*. We now have the *American in Black and White* (two styles), showing the *visible feed* with *water* passing *down* through *Oil*, and *Oil* passing *up* through *water*. Also every other description of *Oiler Cup* except *Journal* Oilers.

We shall be pleased to hear from parties interested in *our* line.

Address all Communications to

AMERICAN
LUBRICATOR CO.,
103 Abbott Street,
DETROIT, MICH.,
U. S. A.

Patent For Sale or Divided



The entire right, title, and interest of letters patent No. 261,382, an improvement in Venitian Window blinds granted Robert Pisak July 18, 1882. This invention may be used on the inside or outside of a window. It is so constructed as to be raised and lowered by means of cords and the lower portion adapted to be outwardly inclined so as to form a protection against the suns rays and give free ventilation

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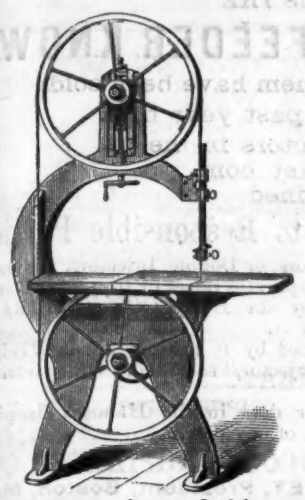

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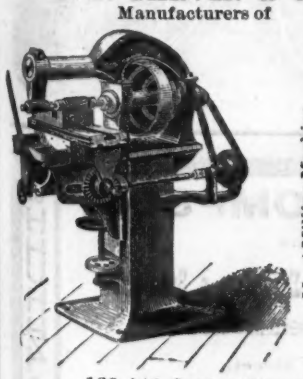

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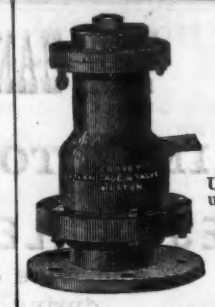

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Crosby Pop Safety Valve,
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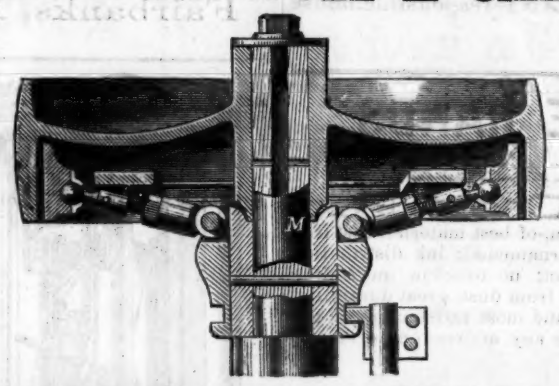

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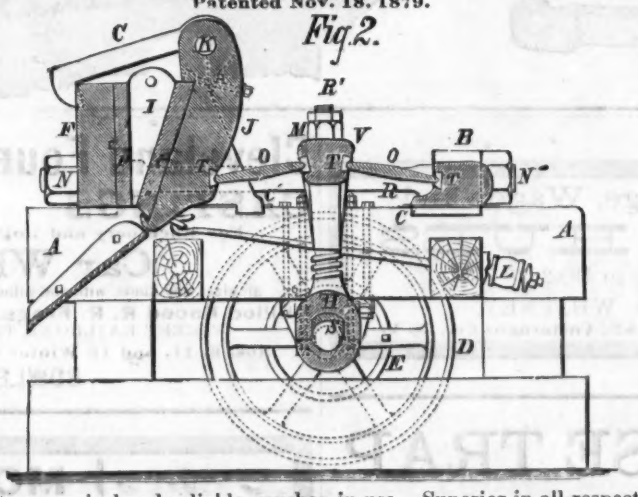

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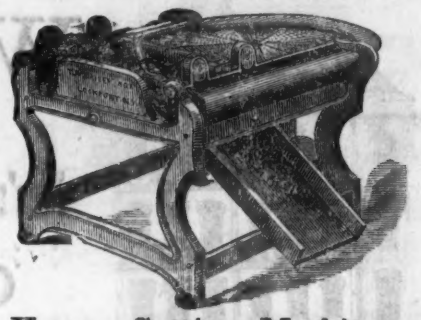

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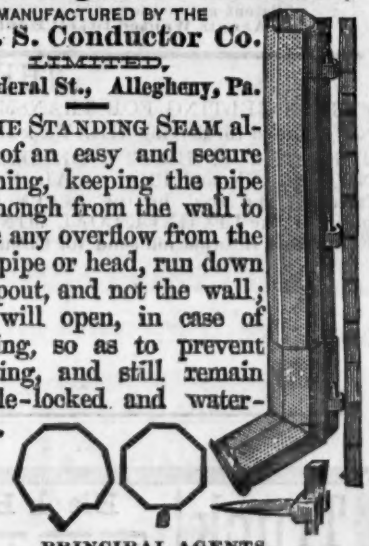
THE STANDING SEAM allows of an easy and secure fastening, keeping the pipe far enough from the wall to make any overflow from the eave pipe or head, run down the spout, and not the wall; and will open, in case of freezing, so as to prevent bursting, and still remain double-locked and water-tight.



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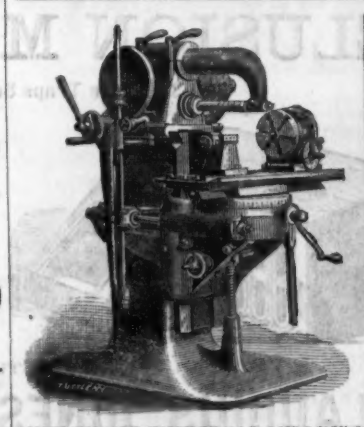

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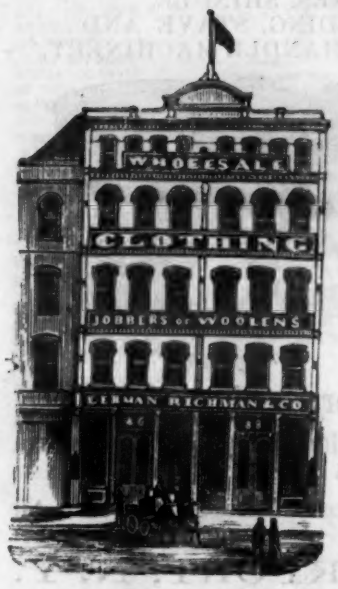

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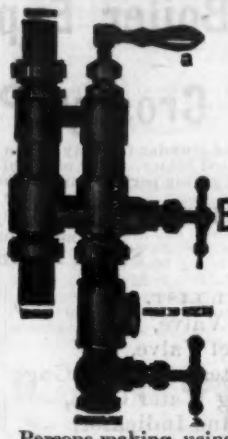

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On the 23d of June a suit in chancery was commenced by it against James Jenks, of Detroit, Mich., for making and selling the "Duplex Injector," so-called. Other infringers will be promptly sued.

The Inspirator Company will defend all who use or deal in the Hancock Inspirator against any suits which allege it to be an infringement of any patent.

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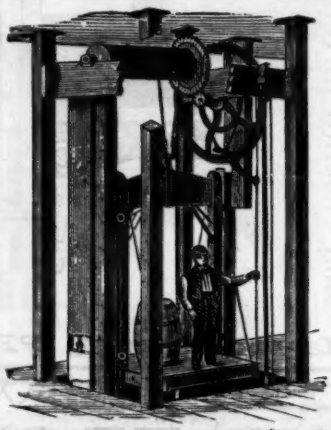

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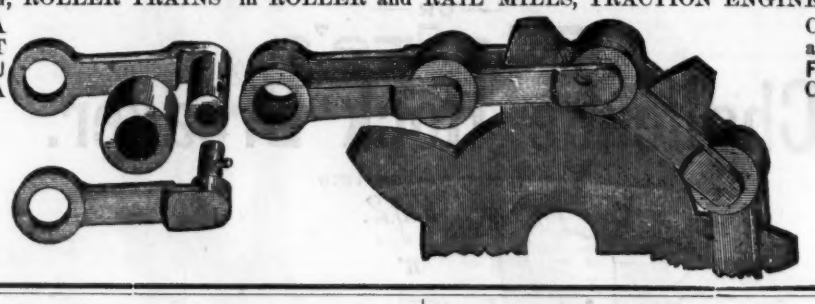
CHAIN BELTING FOR TRANSMITTING POWER. The only medium made that will transmit so nearly ALL the power applied. No slipping nor lost motion. Especially adapted for driving HEAVY SHAFTING, ROLLER TRAINS in ROLLER and RAIL MILLS, TRACTION ENGINES, AGRICULTURAL MACHINERY, ELEVATORS, DRAGS, HOISTS, DREDGING MACHINES, LIFTING CRANES, ELEVATING NUT, SLACK and PEA COAL, SAWDUST and TAN BARK CARRIERS, &c., &c., &c., manufactured and sold by the **LECHNER MANUFACTURING CO., Columbus, O.** Also manufacturers of the LECHNER COAL MINING MACHINES, and power ROTARY COAL DRILLS. For further information send for Circulars.



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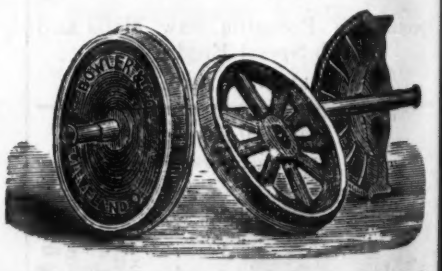

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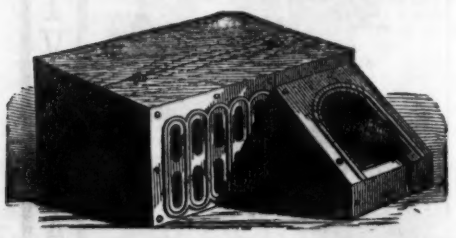
52,932 Mouse Traps Sold in October, 1881.



THIS IS THE ONLY

SELF-SETTING TRAP

ON THE MARKET.

"The mouse goes in to get the bait
And shuts the door by his own weight,
And then he jumps right through a hole
And thinks he's out; but bless his soul
He's in a cage, some how or other,
And sets the trap to catch another."

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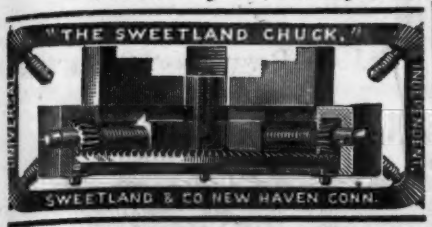

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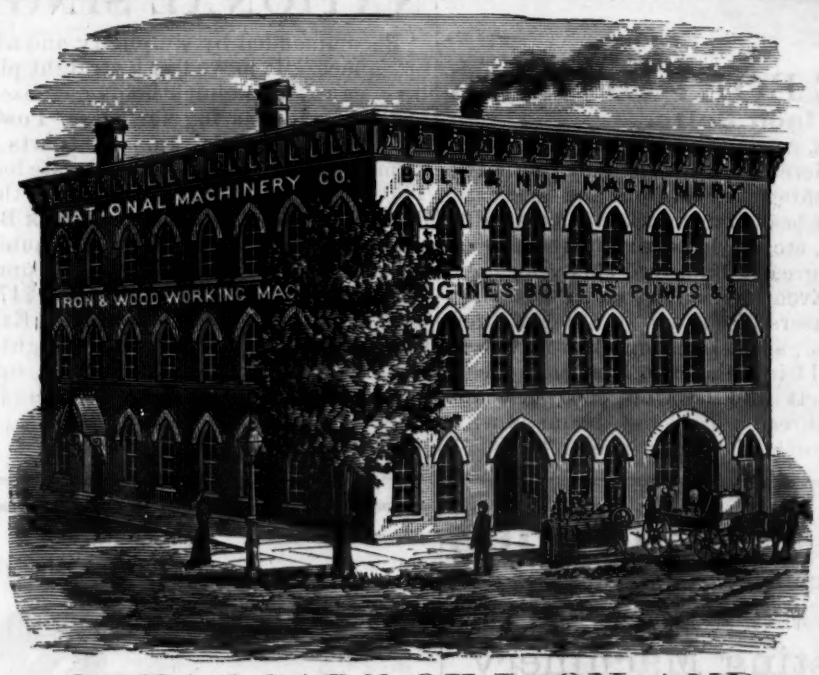

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The Largest Stock of New and Second-hand Machinery

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One " " Ellis Blind Slat Tenoner.
One " " 24-inch Ball & Co., Planer and Matcher.
One " " Power Rod & Dowell machine
One " " Fay & Co. Railway Cut-off Saw.
Two " " Sandpaper Drums.
One second-hand Dimension Planer, 24 inches with feed attachment.
One " " wood frame swing Cut-off Saw and Table.
One " " Slotting Machine.
One " " Thorn & Dehaven Drill.
Two " " Saw Tables.
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Large lot second-hand Trenton Vises.
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16-inch Crank Planer, new.
14-inch Swing Screw-cutting Lathes.
Full assortment of Bolt Cutters.
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Our 8x14, 9x12, 10x12, 10x14, and 12x16 all new.

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Two Skinner & Wood 6 to 8 H. P in prime order.
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DEAN'S PATENT BONE MILL

For grinding green, raw bones without any preparation, into Bone Meal, suitable for Stock, Fowls and Fertilizer. Also for Oyster Shells, Guano, Chalk, Lime, Slate and Soapstone, Feed Corn, &c., &c.

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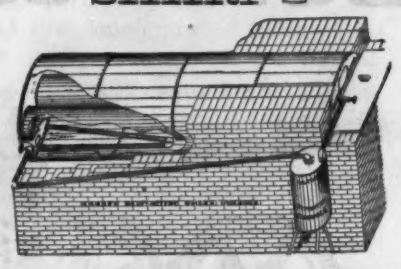

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Patented November 23, 1880.

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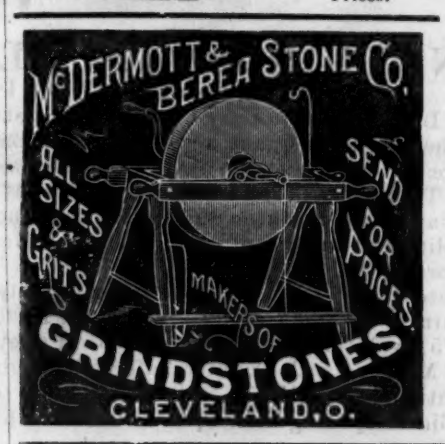

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SPECIALISTS IN

BOLT & NUT MACHINERY,

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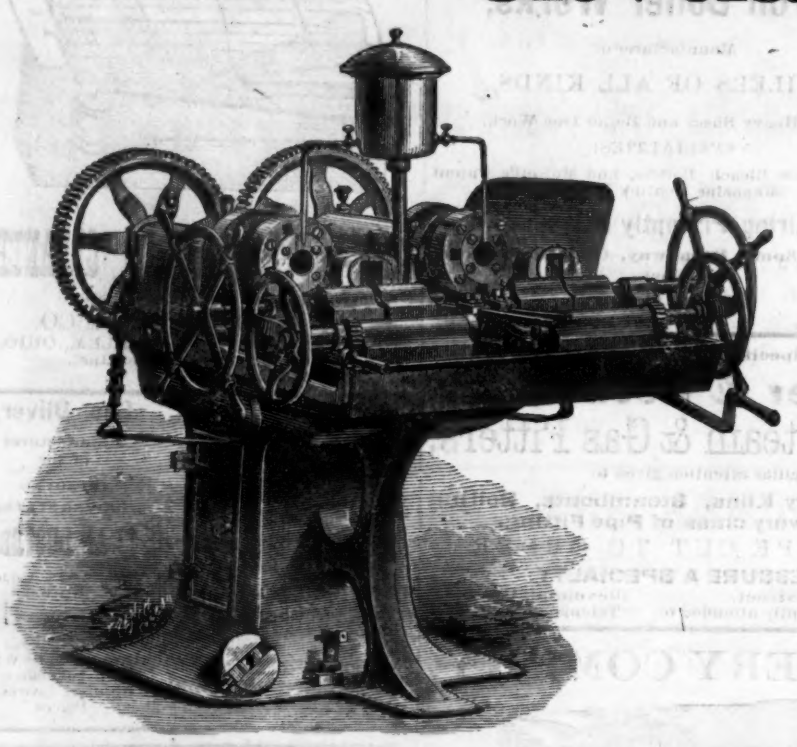

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Capacity up to 1 1-2 Inch Bolts.

Largely used in Car Shops, Railroad Shops, Agricultural and Bolt Shops, or wherever large quantities of Bolts and Lag Screws have to be cut. Spindles are hollow, adjustable outside automatic opening very simple and accurate.

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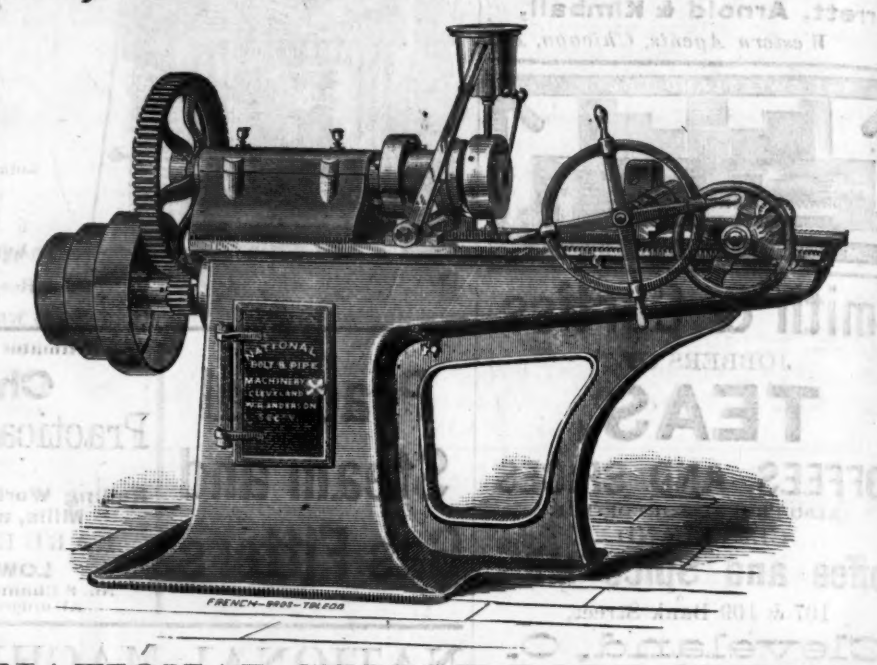

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Recommended by simplicity and adjustability. Cheapest die to keep up or replace. Is moved in a straight plane and straight from work; not forced up a cam. Tap chuck holds any size tap for accompanying machine. Large bearing and wearing surfaces. Powerful gearing. Can cut any thread a solid or opening die can. All parts duplicated. Easily operated. Dogs form the most perfect and accurate lock in the head. Motions are all positive. The simplicity and adjustability of this machine recommends it strongly. A different vice can be used for Track Bolts and short work. Our Case Die has enabled us to present this to the public as the best manufacturing tool in the market. Uses alkali water in pump. Cuts 4,000 per day.

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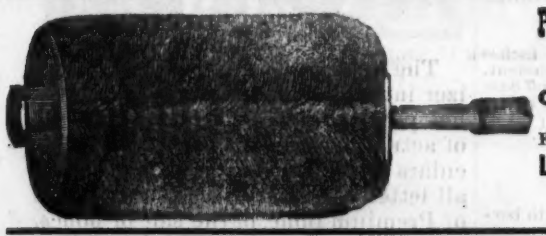

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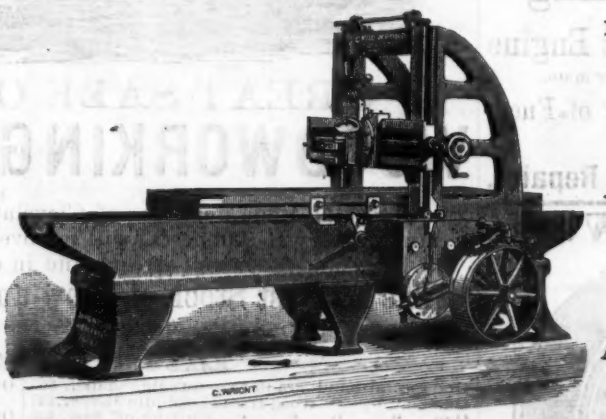

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